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THE NEWS
AIR CONDITIONING, HEATING AND REFRIGERATION
THE INDUSTRY WEEKLY
$15.00 • April 4, 1983

# 1983 STATISTICAL PANORAMA

**National markets and trends plus . . .**

**Housing characteristics market data for 50 states**

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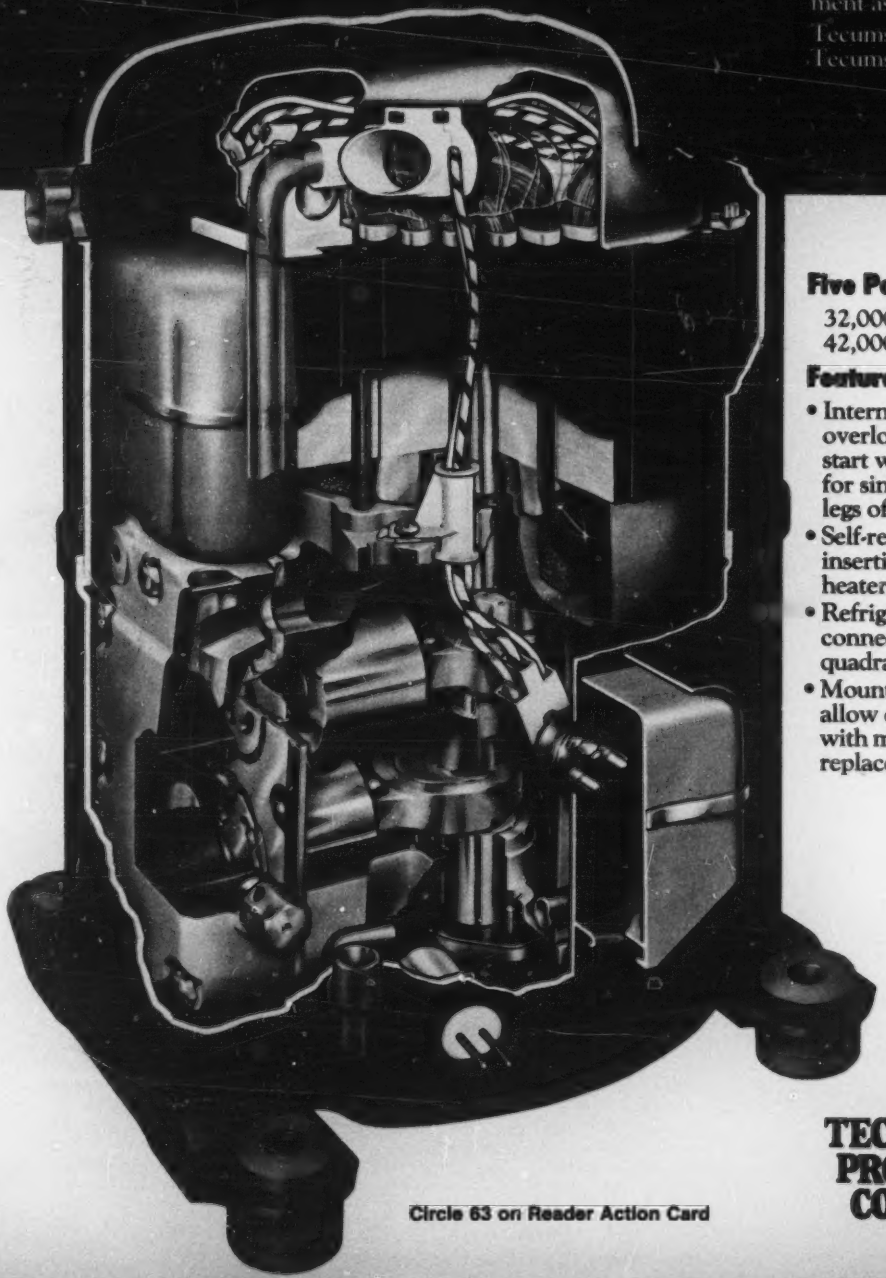
Tecumseh Products Company
Tecumseh, Michigan 49286

## TECUMSEH'S MODEL AV



**Five Popular Sizes**

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**Features**

- Internal line break motor overload with main and start winding protection for single phase—all three legs of three phase.
- Self-regulating, solid state, insertion type crankcase heater.
- Refrigerant and power connections within 60° quadrant.
- Mounting dimensions allow easy interchange with models being replaced.

TECUMSEH PRODUCTS COMPANY

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# "Without FACS Management Systems, We Probably Wouldn't Be Here Today."

*John Lindemulder, Amber Bloom Heating & Air Conditioning, Inc. Chicago Ridge, Illinois*

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"In our business, we are good engineering and technical people. We're not good businessmen. FACS makes a good businessman out of you. You can't help it."

If you would like to see your business running as smoothly as John's, get in touch with us now.

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Name:_____

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FACS
FACS MANAGEMENT SYSTEMS

# Four Good Reasons Why Two Speeds Are Better Than One All Year Long.

Take it from Dave Lennox.

The all new Lennox two-speed Legend® II Heat Pump can profit dealers in four big ways.

**1. The Legend II is More Efficient.** The Legend II has an 11.35 S.E.E.R. — the highest cooling rating ever for a heat pump, and a greater sales advantage for you. The heart of the Legend II (Series HP14) is the proven, Lennox-built two-speed compressor. It permits the unit to deliver exceptional year-round comfort efficiencies through staged heating and cooling capacities, and humidity control matched to load requirements. This unique flexibility means the Legend II operates at low speed about 80% of the time, saving your customers money year in, year out.

**2. The Legend II is More Saleable.** No other manufacturer offers a two-speed residential heat pump. So, Legend II is unique in its appeal to an ever-more energy conscious buying public. The Legend II's remarkable efficiencies, money-saving operation, and its high/low heating and cooling modes are money-in-the-bank features your customers are pre-sold on by Lennox national advertising.

**3. Legend II is More Reliable.** A two-speed compressor runs with less friction and runs cooler than conventional compressors. And outlasts them. The Legend II is a result of 90 years of Lennox craftsmanship and reliability. Ninety years of experience and commitment to one goal: To provide American home-owners with the finest, most innovative indoor comfort systems available. And available only through trained, profitable, independent Lennox dealers.

**4. The Legend II is More Profitable.** No other residential heat pump on the market has the unique features of the two-speed Legend II. Thanks to the thorough Lennox Training Program, dealers know that installation and service are a snap. And this improves profits.

And your customers profit, too. With S.E.E.R.s* of up to 11.35, pay-back periods are shorter. Which means the Legend II is the most profitable heat pump you can sell today.

Add Lennox profitability to your bottom line. Call your Lennox sales office or write Lennox Industries Inc., P.O. Box 400450, Dept. 317 Dallas, TX 75240.

LENNOX

AIR CONDITIONING HEATING

"Attaboy, Dave!"

*Seasonal Energy Efficiency Ratios

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# Reduce fuel costs up to 25%... Save time too!

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**April 4, 1983**
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# STATISTICAL PANORAMA

*by Gordon D. Duffy and Thomas A. Mahoney*

## Forecasts

### AIR CONDITIONING

Although unitary air conditioner shipments slipped by 21% last year, a rebounding housing market should help produce a like increase to 2,260,000 units in 1983. And, if the economy picks up a bit more, or if the summer turns hot, look for at least 100,000 additional sales

### HEAT PUMPS

Heat pumps, used in more than a quarter of new single- and multifamily homes in recent years, took their lumps along with the depressed housing market in 1982. But a 36% gain in housing starts this year should produce at least a 25% hike in heat pump shipments. And this forecast, too, could be a bit conservative.

### FURNACES

Gas, oil, and electric furnace shipments collectively declined by 20.6% last year, victims of the housing slump and an economy that made even replacement sales hard to come by. The turnaround in housing and replacements for reasons of efficiency should produce a 16% improvement this year to 1,664,500 units.

### BOILERS

With the big surge in conversions to natural gas now a phenomenon of the past, residential boiler shipments came within 2% of holding their own last year. Increased housing starts in the Northeast and replacements for efficiency's sake should boost home boiler shipments by a modest 8% in 1983.

### CHILLERS

Faced with a precipitous drop in the office building market in 1982 that will continue at least through this year, chiller shipments will do well in 1983 to cut last year's 10.8% downward slide in half. Other domestic markets are holding even, at best, and overseas markets are showing few signs of early improvement.

### ROOM AIR CONDITIONING

A cool summer, a recession economy, and stiffening foreign competition combined to cut room air conditioner shipments by 25% last year. Economic conditions should ease a bit in 1983 to produce a 5% gain to 2.9 million units but foreign competition will remain tough. A hot summer could add another 10% to the total.

### COMMERCIAL REFRIGERATION

Although we have reservations about reliability, we feel that shipments of commercial refrigeration fixtures declined about 5% last year to 100,000 units. A decline in the number of new supermarkets and remodels that began in the second half of 1982 should turn around in late 1983 to hold shipments even this year.

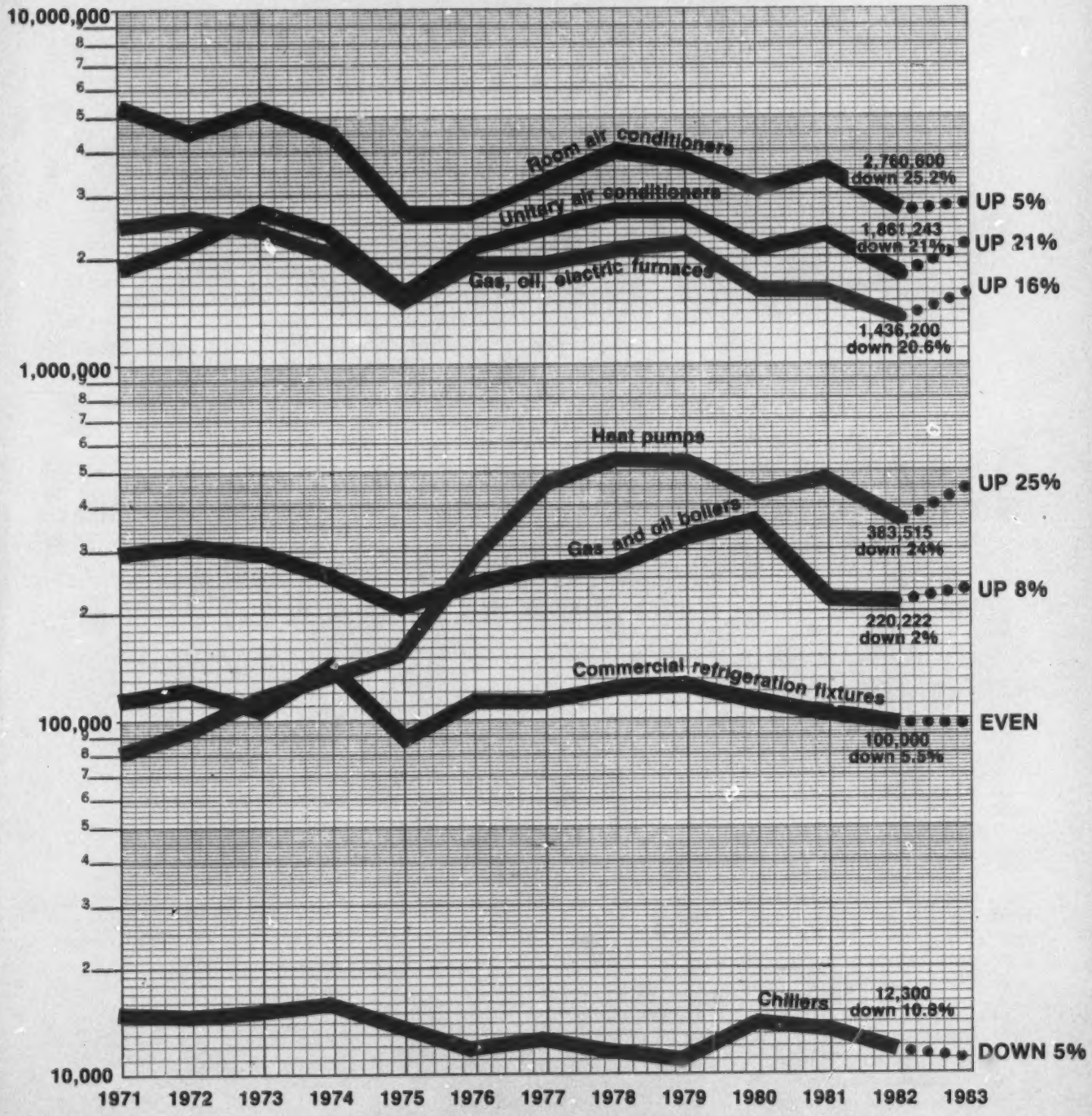
### HOUSING

After hovering at just over one million starts for two years, the lowest level since 1946, it would appear that housing starts this year will increase by 36% to 1,450,000 units. The principal driving forces are pent-up consumer demand and lower interest rates for both home mortgages and builder loans.

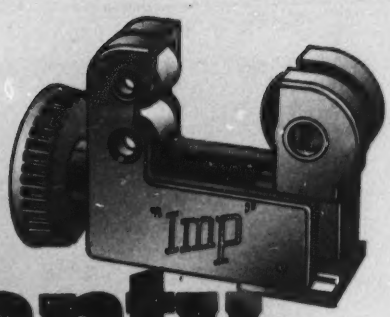
### REPLACEMENTS

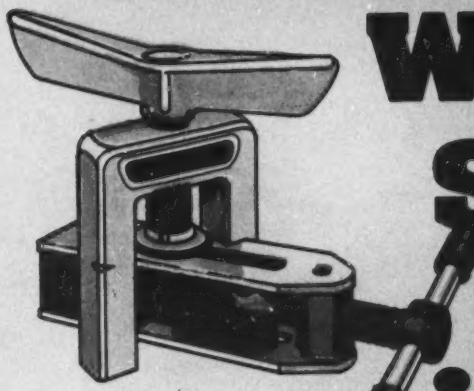
Replacement sales, long a major fact of life in the furnace and boiler markets, were on their way to becoming a major factor in the less mature comfort cooling market. Cooling replacements took a somewhat reduced share of cooling equipment shipments last year but, in 1983, should resume the trend toward a steadily increasing share of the total market.

# Industry trends



# "A lifetime warranty, service and precision is why I buy Imperial Eastman tubing tools."



When professionals choose Imperial Eastman tubing tools, they get a limited lifetime warranty that protects their investment, real service from the tools designed to save an installer's time, plus a host of exceptional operating features for convenience, accuracy and on-the-job precision.

No wonder Imperial Eastman tubing tools have earned a reputation as America's #1 brand. After all, Imperial Eastman originated the best features found on tools in this class today.

**Tom Pruyn, Vice President**
Refrigeration Service Company
Elk Grove Village, Ill.

And as you'd expect, no one matches Imperial Eastman when it comes to selection in professional tubing tools, from benders to cutters and more. See for yourself. Call or write for more information or contact your Imperial Eastman wholesaler today.

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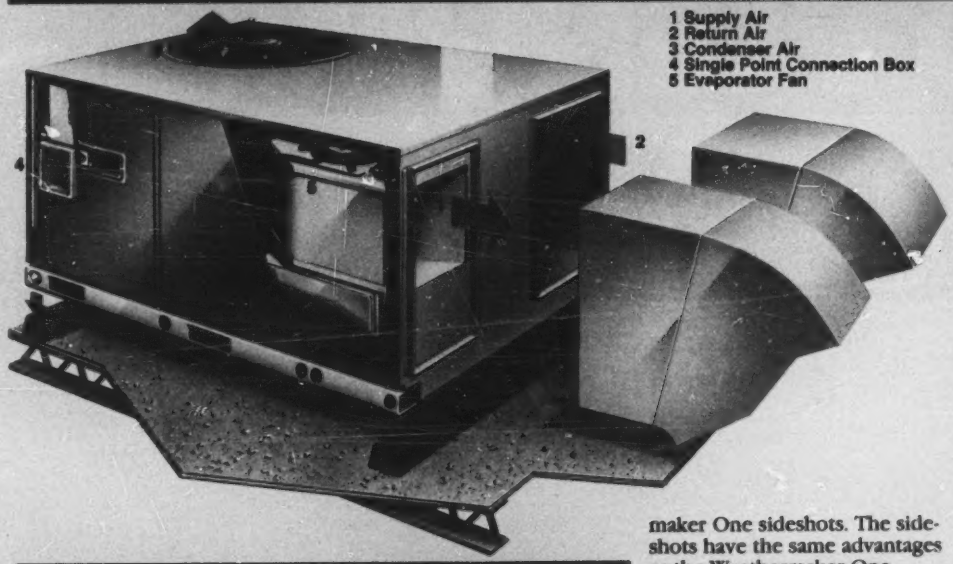
# YOU CAN TEACH OLD PLENUMS NEW TRICKS!

# WITH CARRIER'S NEW HORIZONTALS:

# ROOFTOP REPLACEMENT UNITS.




## THE WEATHERMAKER ONE WITH A TWIST.

**The question was how could we at Carrier accommodate the rooftop replacement market and still provide Weathermaker One technology. The Weathermaker One with its revolutionary "no plenum" feature was a proven success for new construction. But for replacements, the plenum was already there, along with unit supports. To remove these was a costly business and risked damaging the roof which could invite endless trouble.**

**The answer was obvious, of course. We could adapt the Weathermaker One in such a way as to use existing ductwork. We did this by changing the direction of the fan. Instead of dedicated downshot, we made it dedicated sideshot. The same compact, lightweight, efficient, economical Weathermaker One with the same clean air flow but this time sitting side by side with an old plenum. To further simplify the new union, we made the openings on our new units almost exactly the same as those on our old ones. No extra installation cost, no danger of leaks, and the most advanced and efficient unit available. It's a perfect union of the past and future.**

## THE PRODUCTS.

**1.** 5-ton heat pump. A new horizontal unit otherwise identical in every respect to the 5-ton Weathermaker One downshot heat pump. The same compact profile, the same light weight, the same Signal-LOC™ compressor protector, the same high COP, the same refrigerant system safeguard, the same reliable performance.

**2.** 5-ton rooftop air conditioner with electric resistance heating. Sideshot sister to the downshot. Offering 3 selections of electric heat capacity.

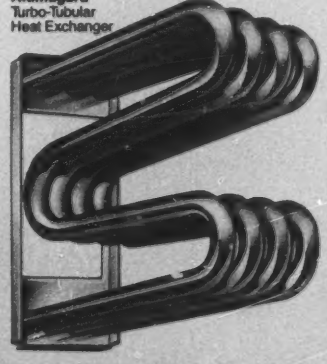
**3.** 7½-ton rooftop air conditioner with electric resistance heating. The greater tonnage demands a slightly larger chassis, and the fan is belt-driven for the same reason. Otherwise, the 7½-ton horizontal shares all the best features of the Weathermaker One at 5 tons of capacity.

**4.** 7½-ton gas/electric. A slightly larger chassis and a belt-driven fan. Akin to the downshot model in having the compact Alumagard™ coated turbo-tubular heat exchanger with the exclusive 4-pass feature for optimum heat transfer.

## THE ENGINEERING.

Now there are Weathermaker One downshots and Weathermaker One sideshots. The sideshots have the same advantages as the Weathermaker One downshots. They're measurably more efficient than what they are replacing. Their fan horse power per ton performance in these sizes is between 57% and 95% lower than most competitive units. The gas/electric units have Alumagard heat exchangers which limit moisture and tend to virtually eliminate corrosion in the heat exchanger. The packaged air conditioners accept slip-in resistance heaters in 3 capacities. All the Weathermaker One units are lightweight and compact and easy to install. Their cabinets are made of galvanized steel and painted with our Weather Armor to stand up to any weather. They're even alike in offering reduced static resistance and smoother air flow.

The basic difference between the two versions is air discharge. Where we turned the fan downward in the Weathermaker One downshot, we laid it on its side for our new horizontals for the express purpose of accommodating existing plenums and other side supply applications.




## DEDICATED SIDESHOT.

We touted the dedicated downshot feature of our original Weathermaker Ones. And here we are about to do the same for the dedicated sideshot version. There's no contradiction here because our Weathermaker One sideshot's air delivery is clearly superior to other sideshots. Even with horizontal discharge, the Weathermaker One fan is still more efficiently placed within the chassis to deliver treated air with less static resistance, less mileage on the fan motor, and less energy spent than any competitive units. And we've got the figures to prove it — our 5-ton units use up to 57% less horsepower and our 7½-ton units are almost twice as efficient.

## INEXPENSIVE TO INSTALL.

It's all the things you don't have to do that makes the Weathermaker One sideshot inexpensive to install. You don't, for instance, have to construct major ductwork. You don't have to juggle interior panels like some competitors. And you don't face the risk of roof damage. Instead, you're handling a smaller, lightweight unit, and its single point power entry will dramatically lower electrical contracting cost.

## THE SAVINGS.

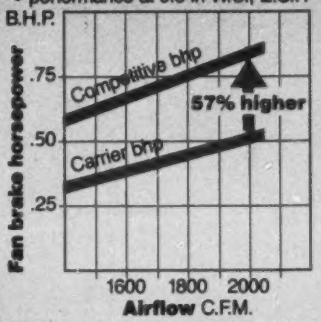
The bottom line is dollar savings which the Weathermaker One sideshots deliver in two ways. On average, throughout the United States, a Weathermaker One air conditioner replacing an old rooftop unit will realize an operating cost savings of $27.00 per ton per year. Calculating with a 7½-ton model, that's $202.50 in a year. We asked an independent electrical contractor for a price differential between single point power entry versus multiple. His charge is $150.00 less when he's putting in a single point power connection. Add that to the operating cost savings in a year and you get $352.50 — a powerful sales argument for the Weathermaker One.

# 5-AND 7½-TON WEATHERMAKER ONE

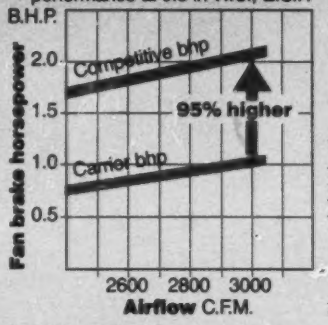
## EASY TO INSTALL.

You'll find the Weathermaker One is probably smaller than whatever it is replacing. And lighter in weight. And more easily transported. The rugged chassis, offering 3-way fork handling capability is well able to take the knocks and jolts of delivery. Transition ductwork, particularly in replacing old Carrier units where old and new openings are sized very closely, is minimal.

5-Ton Air Conditioner
• performance at 0.5 in W.C., E.S.P.




7½-Ton Air Conditioner
• performance at 0.5 in W.C., E.S.P.




## THE DATA.

| Model | 50CH006 | 50QH006 | 50CH008 | 48LH008 | 48HH008 |
|---|---|---|---|---|---|
| Type | Single Package Cooling Unit | Single Package Heat Pump | Single Package Cooling Unit | Single Package Gas/Electric | |
| Capacity (Gross) | 61000 BTUH | | 91000 BTUH | | |
| Heat Input | 7.4, 9.3, 12.3, 13.6, 15.8 (K.W. Electric) | | 9.3, 15.8, 31.5 (K.W. Electric) | 63000 (min) 114000 (max) | 85000 (min) 152000 (max) |
| Voltages | 208/230-1-60, 208/230-3-60, 460-3-60 | | 208/230-3-60, 460-3-60 | | |
| CFM Range | 1500-2500 | | 2300-3700 | 2300-3500 | |
| Static Pressure | .15-1.13" E.S.P. | | .1-1.1" E.S.P. | | |
| Weight (LBS) | 480 | 540 | 730 | 890 | |

## THE PRICELESS INGREDIENT.

It's all those things we claimed for the original Weathermaker Ones. The extensive testing of each unit, the sturdier compressor mount, the protective vinyl-covered cap tubes, the recessed fins, the heavy plastic wrapping at shipping time, etc. . . . It's also all the trademarks that accompany so many parts of the Weathermaker line units — indications of improvements that we've devised or designed to make our products work better or last longer. It's even the breadth of application for Weathermaker Ones from the variety of sizes to the choice of downshot or sideshot versions. These are all different expressions of the same thing — Carrier quality.

## THE HIGHLIGHTS.

- Horizontal discharge.
- Weather Armor cabinet.
- Four-pass turbo tubular heat exchanger in the gas/electric.
- Alumagard heat exchanger in the gas/electric.
- Signal-LOC safety circuit on all units.
- Commonality of parts with other units & sizes.
- Low horsepower fan performance.
- Low profile.

## THE SEALS.

Of course. Every Weathermaker One is ARI certified. The packaged air conditioners and the heat pumps are UL listed. The gas/electrics have AGA approval plus. In fact, we've put the turbo-tubular commercial grade heat exchanger in our 7½-ton unit through a grueling cycling test of over 30,000 cycles — more than three times the number required by the AGA — with approximately five times the stress on the heat exchanger to prove it is commercial grade.

ARI 210 ARI 240

## COMPETITION.

There are other side supply rooftop units. They're larger. They're heavier. They have greater static resistance and use more horsepower for their fans.

There's a lot more to be said about our horizontal Weathermaker Ones. We've put it in a brochure which is yours for the asking from your nearest Carrier distributor. Or you can write to Carrier Air Conditioning, P.O. Box 4808, Syracuse, New York 13221.

| | Packaged Air Conditioner | | Packaged Gas-Electric | | Heat Pump | |
|---|---|---|---|---|---|---|
| | Vertical Discharge | Horizontal Discharge | Vertical Discharge | Horizontal Discharge | Vertical Discharge | Horizontal Discharge |
| 3 TON | | | ● | | | |
| 4 TON | | | ● | | | |
| 5 TON | ● | ● | ● | | ● | ● |
| 7½ TON | ● | ● | ● | ● | | |

SEALS: ● UL ○ ARI 210 ● ARI 240 ● AGA

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UNITED TECHNOLOGIES CARRIER AIR CONDITIONING

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Circle 13 on Reader Action Card

# How do you profit from an energy-conscious market?

# YOU PROFIT FOUR WAYS

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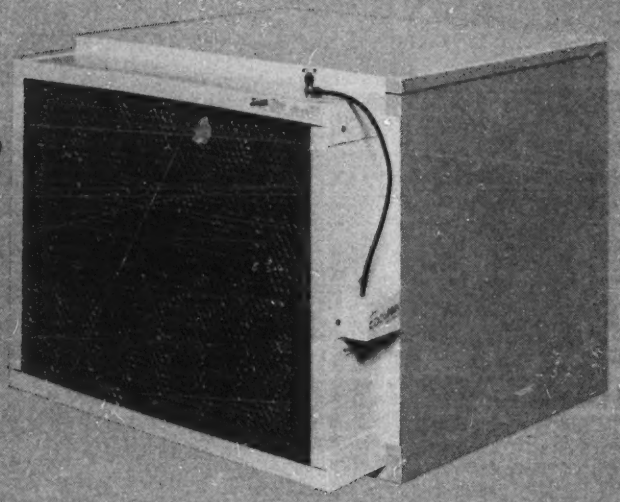

The best thing that ever happened to air conditioning! COOLPAK pre-cooler reduces the temperature of the air entering the condensing coil of an air conditioning system. This increases the condenser's capacity, lowers operating costs, prolongs air conditioner life and reduces energy costs up to 20%! And, up to 25% during periods of peak demand charges (where applicable).

People have waited a long time for a proven way of reducing cooling costs. Now you can show them the way. COOLPAK pre-cooler—it's a welcome addition to our product line and to your profit picture.

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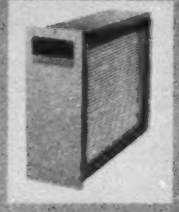
So successful, even the 'electronic' competition is imitating it—and well they should. Space-Gard air cleaner, the original non-electronic air cleaner adapts easily to any forced air system. Removes 99% of pollen and spores, 90% of dust and dirt from system circulated air. No electrical components or working parts—its minimum maintenance and affordable price will maximize your market and your profits!



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The Suncell system consists of factory assembled solar collectors, air handling unit and controller. With the addition of installer-supplied heat storage area, ducts, manifolds and auxiliary heating it becomes a complete solar heating system.

With 100,000 baffles in each cell of the unique absorber, heat transfer surface area is three times that of a single plate! Adaptable to residential space heating and service hot water, commercial and industrial applications. And, an available demonstration unit for installation on your building will make your dealership the solar heating headquarters.

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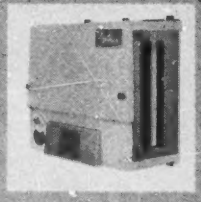
The most respected and best product name in humidification! The Aprilaire line includes power humidifiers; bypass models—drain-equipped or with a water circulating system; high capacity residential, commercial and industrial models for any type installation. All feature accurate control, long lasting construction and minimum maintenance—all big +'s for you and your customer!



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*Manufacturers of products for better air . . . everywhere.*

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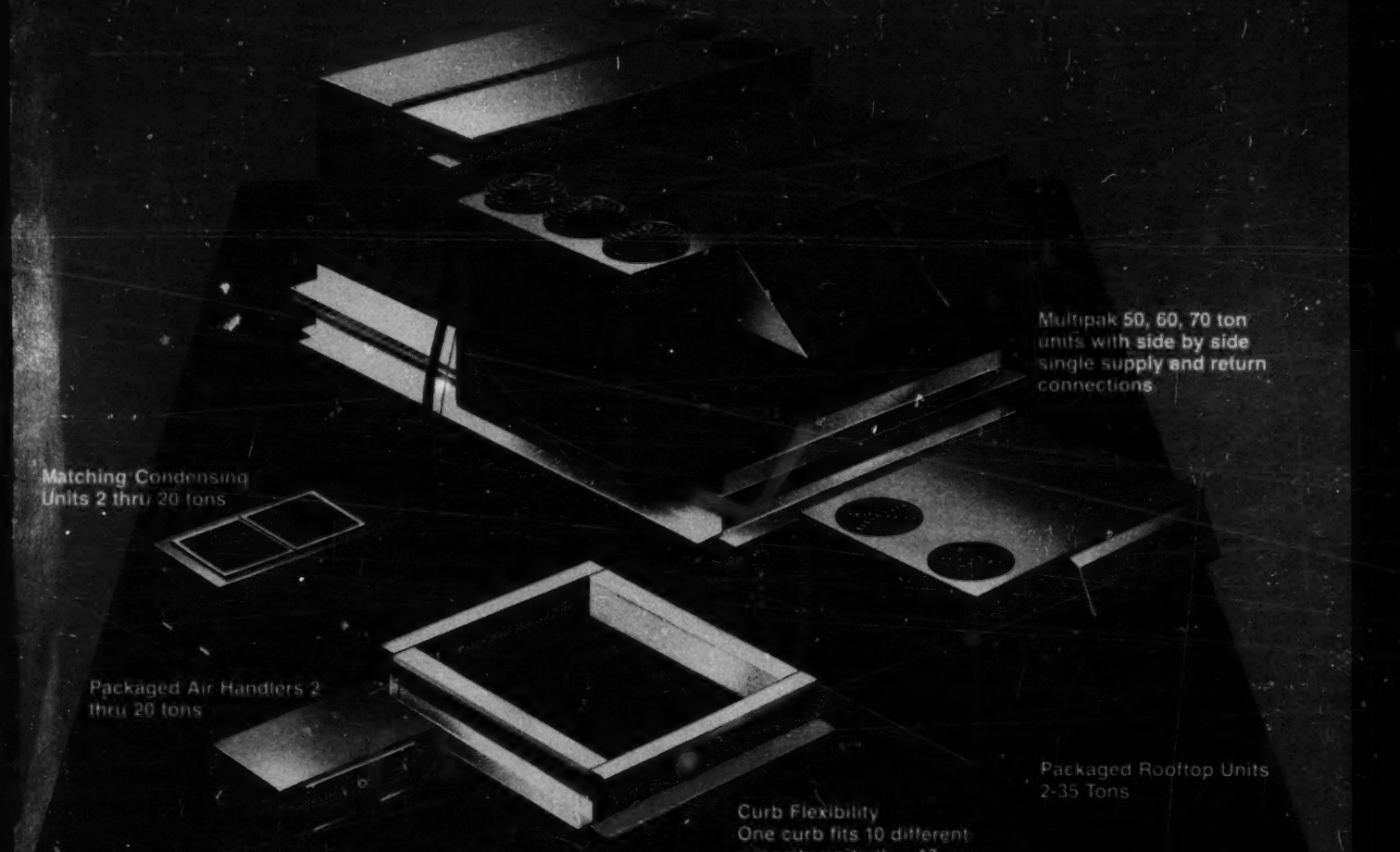
# Our package heating and cooling range now extends from 2 through 70 tons. All efficient, economical, reliable.


Multipak 50, 60, 70 ton units with side by side single supply and return connections
Matching Condensing Units 2 thru 20 tons
Packaged Air Handlers 2 thru 20 tons
Packaged Rooftop Units 2-35 Tons
Curb Flexibility
One curb fits 10 different capacity units thru 13 tons Just four curbs accept Climate Control's complete line 2 thru 70 tons.

Climate Control packaged heating and air conditioning units consists of 2 thru 20 ton split systems, 2 thru 35 ton roof tops. And now we're introducing our all new 50-60-70 ton Multi-Pak units in cooling only—VAV, Electric and Gas heating.

These packaged rooftop units come fully factory assembled and 100% factory tested. Standard features include integral plenum with 25% fresh air damper, vertical or horizontal discharge, low ambient control and a high EER.

What's more, Climate Control rooftop systems feature the flexibility of Variable Air Volume.

Because no two areas have the same heating and cooling requirements, these units supply conditioned air only when and where it's needed. And speaking of flexibility, we have engineered one roof curb capable of holding a wide range of down discharge unit sizes. Pre-installed curbs mean you won't have to break through the roof later to install properly sized units.

For details, call or write: Commercial Products Division, Climate Control, A unit of the Snyder General Corporation, 62 Columbus St., Auburn, N.Y. 13021. Phone: (315) 253-2771.

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# YOU CAN'T BEAT THE SYSTEM.

THE SYSTEM EXPLAINED

A FINAL WORD

Honeywell

Circle 31 on Reader Action Card

# 1983 in perspective

Remember that refrain we have heard so often these past few years, "The upturn will come in the third quarter"?

It was partially true in 1982. The national economy, in recession since mid-1980, finally began to stir. Its twin enemies, inflation and high interest rates, appear to be under control — at least temporarily — even if the cost has been more than one in 10 out of work.

Housing, which has been on the skids since late 1978 and just experienced its two worst years since 1946, promises a solid rebound this year. And with it will come much-needed increases in the shipments of central air conditioners, heat pumps, furnaces, boilers, and accessories.

But all is not a bed of roses.

The large commercial market has seen the 1981 boom in office buildings come and go. It looks like a lean year in 1983, especially because there is little prospect for increases in export sales. And with industrial plants running at only two-thirds of capacity, expansion in this area is at least one, and probably two, years away.

The light commercial market, which sagged in the last half of 1982, shows promise of rebounding in the second half of this year as it follows the upward road being blazed by new home construction. And the refrigeration market, never spectacular in lean or boom years, should lose only a little of its momentum.

It has been a tough couple of years for most of the industries served by this newspaper. There have been layoffs of blue and white collar workers aplenty. Many plants worked at half speed or only three or four days a week. Competition among contractors for available work and among manufacturers for available business was fierce. And there have been business failures.

But unlike the recession of 1975, inventories have been well managed for the most part. The question now arises whether, in response to the surge in housing starts, the industry can react in time to avert product shortages. There are signs the home heating industry already may be having trouble in this area.

Although the drop in unitary air conditioner shipments last year — from 2,367,483 units in 1981 to 1,861,243 units — was 21.4%, the real rate of decline was more like 15% when adjustments are made for inventory. The industry entered the year with inventories on the high side of normal and ended it with inventories just below the normal range.

The recovery of the housing industry and a relatively stable light commercial market should produce a 21% increase in unitary shipments this year to 2,260,000 units — still far below the 2.8-million boom years, but respectable.

The add-on market probably will continue its lackluster performance, but the replacement market, aided by a marked increase in consumer confidence, should regain its upward growth curve. Contractors are not apt to experience this year the reluctance last summer of some consumers to repair or replace failed units because of fears for their own jobs.

Shipments of heat pumps, which rely heavily on new housing starts, dropped 25% last year to 383,515 units from 504,786 units in the previous year. Heat pumps have been used in one of four new single-family homes built in recent years and the increase in housing starts should help this product bounce back this year by 25% to 480,000 units.

Smaller increases are expected for water-source heat pumps, which are gaining in popularity for both homes and offices. The biggest disappointment to date is the air-to-water heat pumps used for domestic water heating.

On the heating side, residential boilers expect to make up this year the small (7.5%) setback suffered in 1982. Oil furnaces staged a 27.5% comeback in 1982 after a precipitous slide at the turn of the decade because of heavy conversions to gas.

Gas furnace shipments, on the other hand, dropped 18% last year to 1,155,600 units, largely because of

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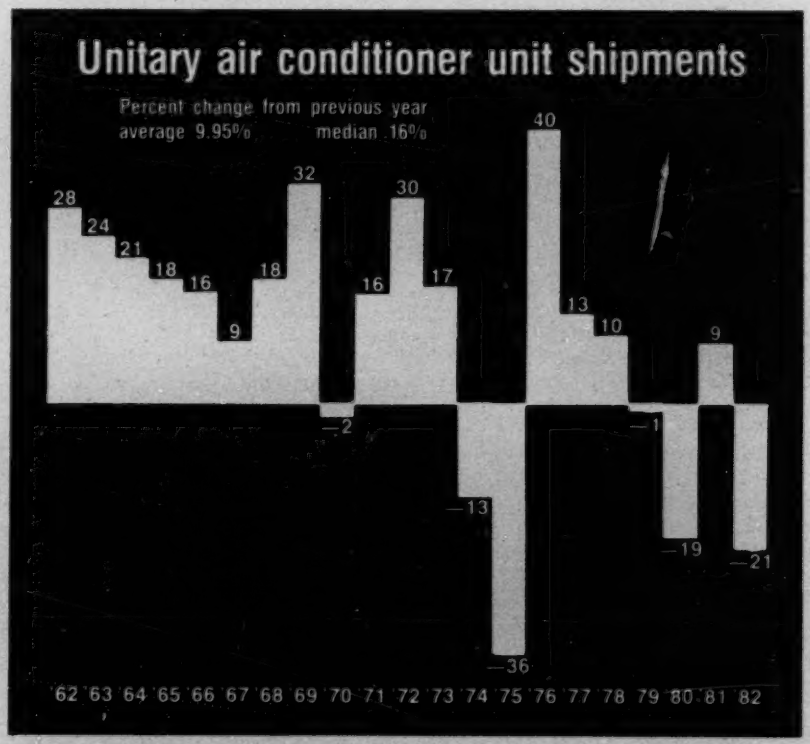

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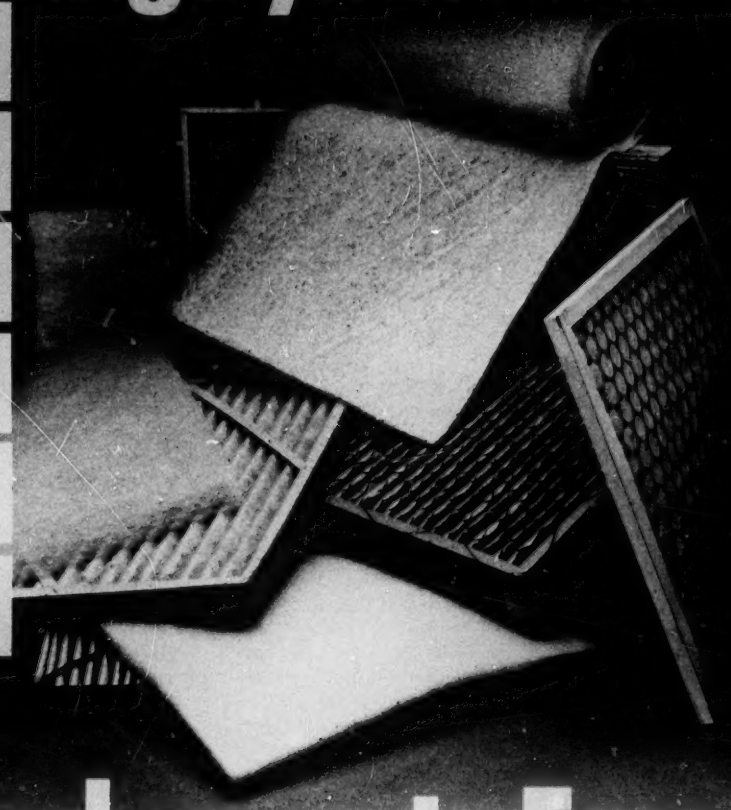

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Use this chart to see how your filter stacks up to the 30/30. You'll see it's time you made a change for the better.

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| Easy to service | | X |
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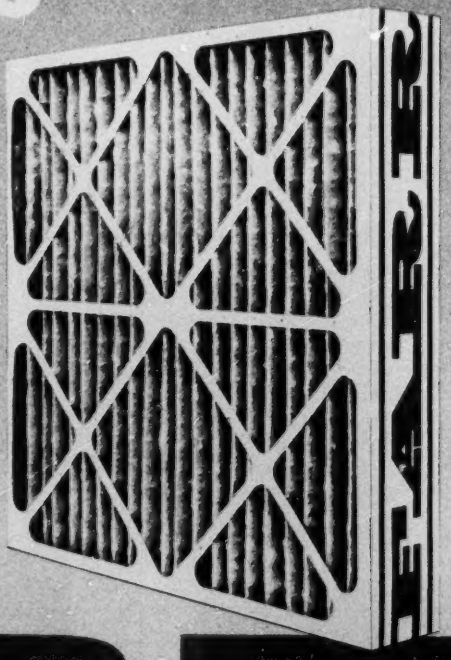
| Reliable performance | | X |

If you're tired of always changing filters, change your mind. Contact your local Farr Distributor. Or Farr Company, Commercial Products Division, 2301 Rosecrans Avenue, El Segundo, CA 90245 (213) 772-5221.




Circle 22 on Reader Action Card

FARR

FROM PAGE 17

the housing industry's miserable performance. Housing's recovery this year should produce a 16% increase to 1,340,000 units.

There is strong evidence that manufacturers were caught flat-footed by the quick recovery of housing and that inventories were quickly depleted. But because the surge came so early in the year, there is little worry that the experience will materially affect this year's total shipments.

Electric furnaces, another victim of the housing slump, should recover in 1983 in step with housing and heat pumps. And this year for the first time, The News has taken a look at the impact of the more than eight million space heaters being sold annually in the United States (see "Heating").

### Efficiency

Public response to the availability of high-efficiency home heating and cooling equipment in the face of high interest rates and a shaky economy has been phenomenal. It began with residential air conditioners and heat pumps, but there is solid evidence that it now includes central heating equipment as well.

ARI reported that nearly four out of five unitary residential air conditioners shipped last year had an SEER (Seasonal Energy Efficiency Ratio) of 7.5 or more and that nearly half (45.7%) had an SEER of 8.5 or more. Similarly, three out of four residential heat pumps shipped last year had an SEER in the cooling mode of 7.5 or more.

Last year's record is the latest step in a steady climb up the efficiency ladder from 1976 when only one in four unitary air conditioners and one in 10 heat pumps had an EER of 7.5 or more. It's a graphic refutation of the argument that the public generally and home builders in particular will always opt for the lowest cost if they are given the opportunity.

There was plenty of help. California, New York, and Florida (new construction only) have installed mandatory efficiency minimums but, even together, they don't account for a third of the high-efficiency total.

Another major factor has been incentives offered by many summer-peaking utilities to encourage home owners to install efficient comfort cooling equipment so the utility can postpone the addition of new generating facilities.

But behind it all there appears to be an overall acceptance by homeowners that high efficiency is a worthwhile investment and something they can do personally to protect themselves against steadily increasing electricity costs. This was borne out, we feel, by two News surveys which showed that, in both 1982 and 1983, high-efficiency equipment was at the top of consumer want lists.

Nor has the quest been confined only to cooling equipment. For several years now, more than four out of five replacement oil burners have been of the retention head or other high-efficiency type. And an increasing number of homeowners are replacing split-system air conditioners with heat pumps on existing oil and gas furnaces in order to get the best economy from each.

Gas furnaces for many years were comparatively simple affairs with atmospheric burners and standing pilots which achieved efficiencies of about 60% on an annual basis. When gas prices began to escalate, some states banned pilots and furnaces were upgraded to include electric ignition and, in many cases, vent dampers to increase efficiency slightly.

In recent years, recuperative furnaces and power burners raised annual efficiencies to the 80% to 85% level. In the past year a pulse combustion furnace joined an already available pulse combustion boiler and these, together with another condensing furnace, established a new efficiency class in the range above 90%.

What is, perhaps, remarkable is that these ultra-high-efficiency furnaces have been selling well despite their high cost and poor economic conditions — and in a year when shipments of their less efficient counterparts dropped by 18%. What's more, early reports indicate that three out of four are replacing older furnaces in good operating condition. Again, it would appear to be a hedge against higher fuel prices.

The effect of the turmoil in the

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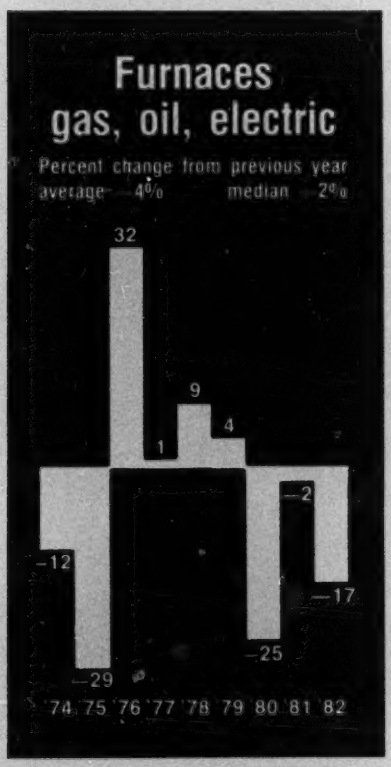


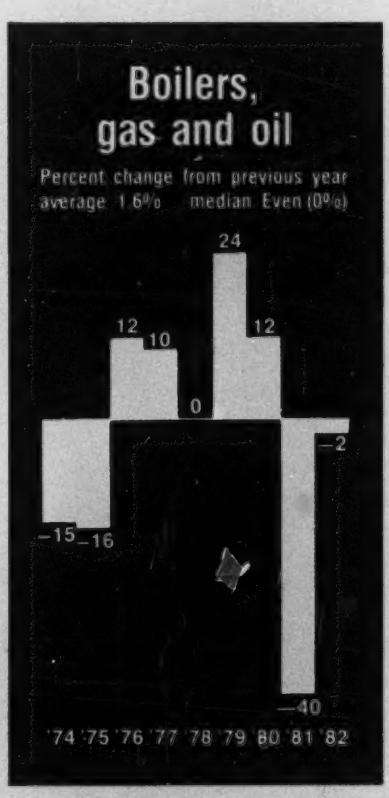

FROM PRECEDING PAGE

energy markets on this drive toward higher efficiencies remains to be seen.

Certainly there appears to be little possibility that electricity costs will come down. The softening of world oil prices, too, is not likely to have much material affect on domestic prices, although there is no way yet to judge how it will affect people's outlook.

The decision of whether or not to decontrol natural gas prices before the scheduled date of July, 1985, would appear to have been made. President Ronald Reagan, who decontrolled oil prices when he first took office and promised early decontrol of gas, likely will leave natural gas prices alone

The issue is complicated by still-escalating natural gas prices, partly because utilities signed take-or-buy contracts with suppliers in order to encourage them to go after deep gas and so avert a dwindling supply problem. Congress now has made it a political problem, and the outcome is uncertain.

A two-year tally of fuel prices compiled by the Department of Labor as part of the cost-of-living index shows that, from December, 1981, to December, 1982, fuel oil prices dropped 1.5% from $1.247/gal to $1.229/gal. Since that time, oil prices have declined to about $1.14/gal, or an 8% drop.

During the same period, natural gas prices increased by 27.5% from $46.369 per 100 therms to $59.156 ($72.951 in the Northeast, $48.55 in the West), and 500 kWh of electricity increased by 6% from $34.96 to $37.074 ($45.667 in the Northeast, $32.321 in the West).

The exclusive availability again this year of figures which allow us to measure comfort heating-cooling and fuel penetration by region for homes built in the previous year (see "Comfort in construction") again underlines the importance of southern markets.

More than 54% of all homes completed in 1982 were in the South where 85.7% of single-family and 97.3% of multifamily homes were equipped with central air conditioning. Heat pumps also captured a 35.3% share of new homes completed in the South, 3% more than natural gas.

The penetration of central air conditioning into homes built across the U.S. in 1982 was 66.7%, up from 64.3% in 1981, for single-family homes and 88.4% for multifamily units, up from 84.4%. National heat pump penetration into single-family homes was 26.6% last year, up slightly from 24.2% in 1981.

Electricity continued to be the dominant fuel for both single-family (50.2%) and multifamily (68%) homes. Gas had a 40.4% share of single-family homes and oil was used for 1.8%, both close to 1981 experience. Other fuels accounted for 6.3% of single-family homes last year, up from 4.8% in 1980, and including about 10% penetration in the Northeast and North Central states.

It was a bad year for accessories. Both power humidifiers and electronic air cleaners fell victim to the lack of housing starts and the pressure on disposable income in 1982, a condition that should reverse somewhat this year.

### Regulation

Federal minimum efficiency standards for residential heating and cooling equipment, which hung like a cloud over the industry from 1976 to 1981, now have been found unnecessary by the Department of Energy (DOE). Consumer and industry response to the need for higher efficiencies was listed as the prime reason for the action.

Final regulations still have to be issued, however, and with them will come the method states may use to obtain an exemption from the federal rule. Individual actions by states, particularly those with major markets, could cause even tougher problems for manufacturers than a single federal standard.

Still remaining, however, are the energy labels and fact sheets mandated by the Federal Trade Commission for furnaces, boilers, room air conditioners, and other major appliances. Central air conditioners and heat pumps so far have escaped, primarily, we suspect, because DOE-sponsored studies have shown the labels are not being used by homeowners who buy central equipment.

In the wings, but not an immediate threat, is a continuing desire by some within DOE to mandate performance standards for buildings, a project that already has been rejected by Congress. There are others who would make the now optional home and commercial energy audit programs mandatory on grounds that energy savings which would come about through natural market activity in 10 years could be accomplished in five to seven years through mandatory audit programs.

### Construction values

Construction contracting volume in 1982 totaled $154.6 billion, according to Dodge/Sweet's Construction Outlook, only 3% more in dollars than the $150.2 billion recorded in the previous year. The 1983 estimate of $178.3 billion, up 15%, will increase in real terms for the first time in three years. This is due to the 48% dollar increase for residential construction and other increases in nonbuilding construction.

The boom in new office buildings, which accounted for 317 million ft² and $19.2 billion in 1981, would appear to be over. Last year office buildings accounted for only 260 million ft², down 18% in real terms, and $17.2 billion, down 10% in dollars. The 1983 outlook is for a drop of 29% to 185 million ft² and a drop

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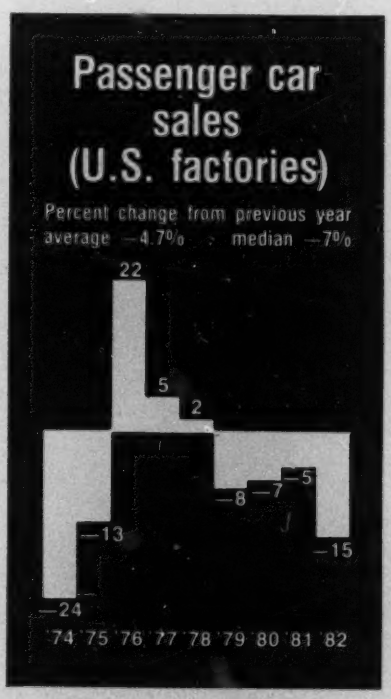

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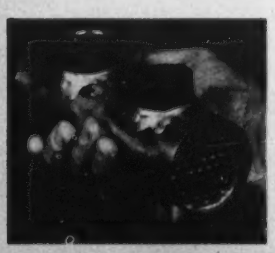
When you're No. 1 in experience (75 years), No. 1 in broadest line, No. 1 in innovation, No. 1 in efficiency, No. 1 in sub-cooling, No. 1 in capacity per lineal foot; No. 1 in local availability, No. 1 in customized heat exchangers, you can offer solutions to cooling problems that no one in the industry can match.



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Our range of line speaks for itself. 606 models of chillers from 2 to 160 tons. 170 models of subcoolers from 2 to 115 tons. 108 models of condensers from ½ to 150 tons. 38 models of heat exchangers from ¼ to 100 tons.

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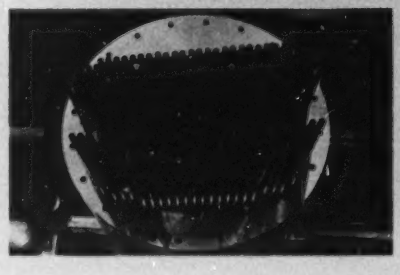
Our chillers are physically smaller and lighter weight because they're fabricated with advance design INNER-FIN tubes that increase heat transfer surface area significantly.



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Availability? 24 hour delivery is our motto. That's door to door. Regional distribution centers make it happen. Houston. Chicago. Harrisonburg, Virginia. Riverside, California. West Hartford, Connecticut. Heart of our distribution network . . . 354 dedicated refrigeration wholesalers ready to serve your every need.

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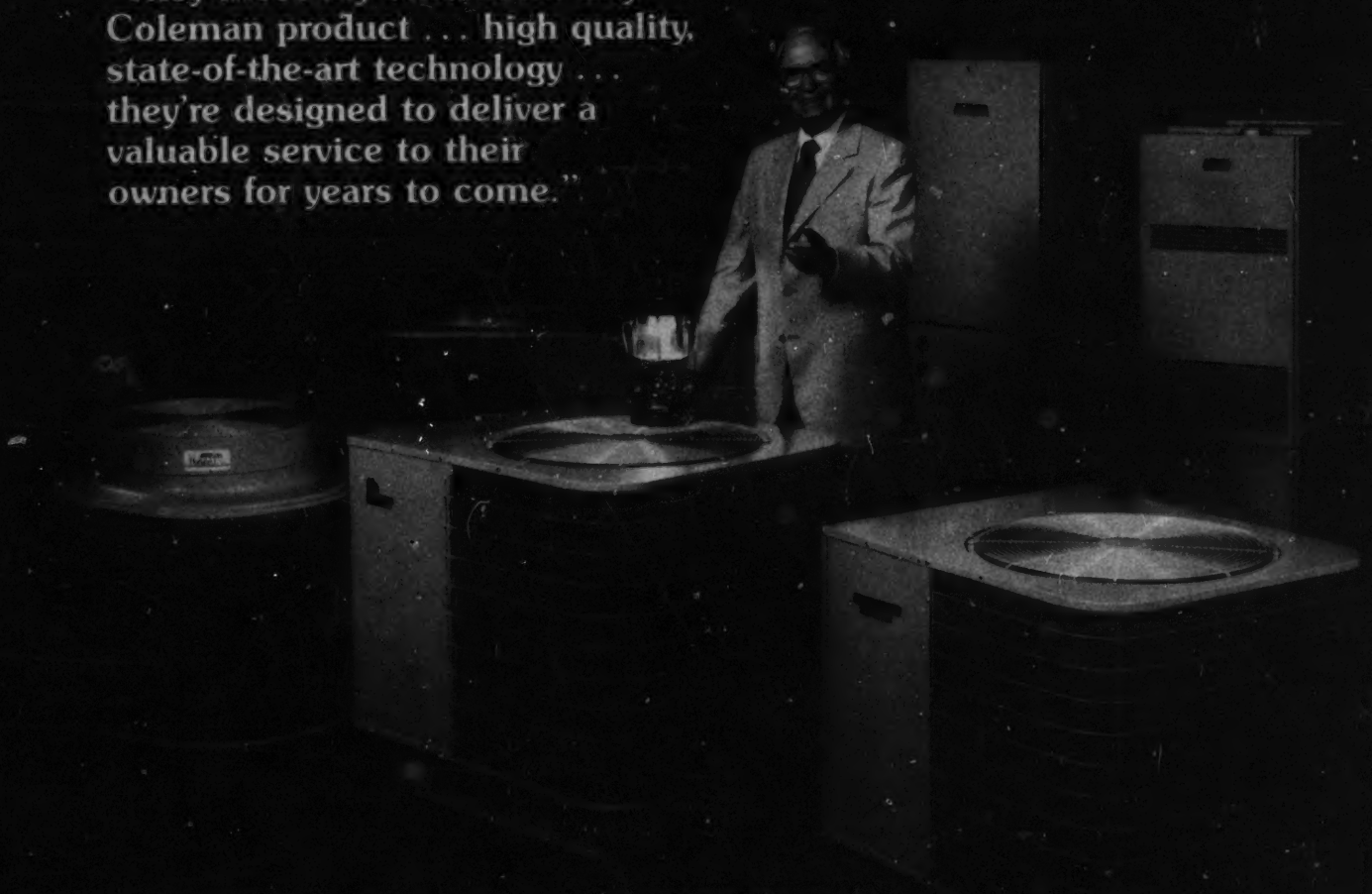
*Sheldon Coleman, Chairman of the Board, The Coleman Company, Inc.*

"They meet my criteria for any Coleman product . . . high quality, state-of-the-art technology . . . they're designed to deliver a valuable service to their owners for years to come."



"For over 80 years, this lantern and our slogan—The greatest name in the great outdoors—have symbolized our commitment to outdoor recreation.

What many people don't know is that for more than forty of those years Coleman has been pursuing *indoor* heating and air conditioning with that same kind of commitment.

The single-minded pursuit of excellence that made our outdoor gear respected around the world has given us a range of high quality, energy efficient heat pumps, air conditioners and furnaces.

I believe they are exactly right for our energy conscious world."

**Quality that can only cost you less in the long run.**

Coleman® HEATING & AIR CONDITIONING

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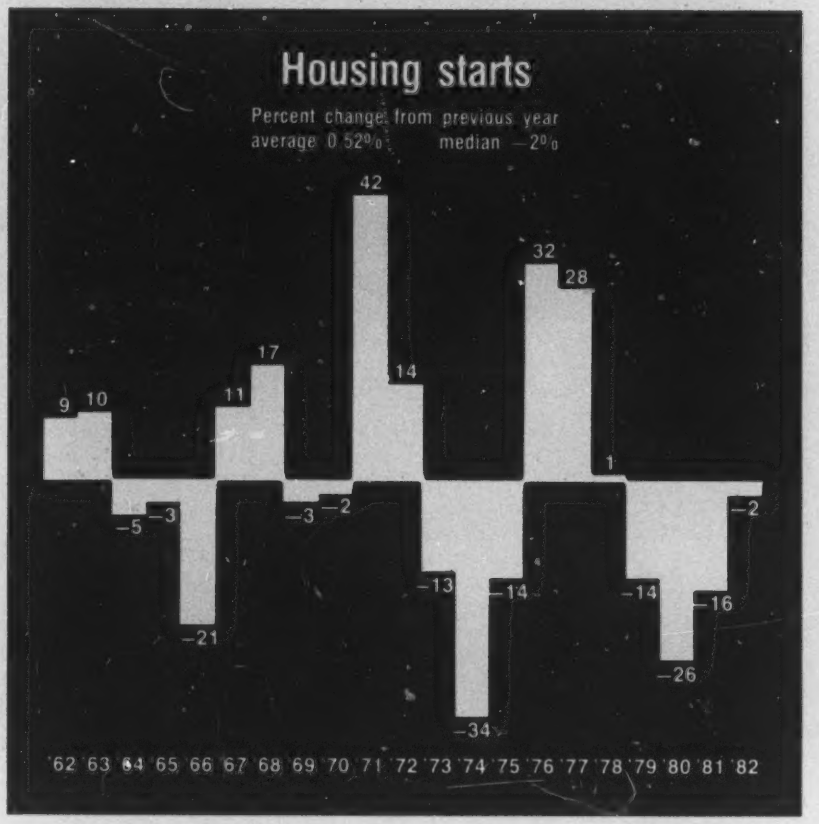
in dollars of 26% to $12.8 billion.

The star in 1983, according to Dodge/Sweet, will be a 40% increase in new home construction to 1,475,000 units. Nonhousekeeping residential construction this year will decline by about 5% in real terms.

Another bright spot is light commercial construction, which held up reasonably well in 1982 and promises to expand by almost 10% in real terms — and 14% in dollars — this year.

At the bottom of the list is industrial construction, which is expected to decline from already low levels by 5% in real terms and by 31% in dollars. Depreciation and tax incentives so far have not been able to make up for the low loading of most industrial facilities.

Construction of hospital and health facilities, together with education facilities, will continue to hold about even in 1983. Hospital construction, particularly, has been strong. The acceleration of previously approved public projects will keep public construction about even with 1982 performance.




### The economy

There is ample evidence that, after three years in the doldrums, the national economy finally has turned the corner. But, at the same time, the recovery promises to be gradual — with the exception of housing and, to a lesser extent, autos — and many of the vestiges of prior years such as unemployment will still be there at year's end.

The gross national product (GNP), in real terms, declined last year by 1.8%. The puzzle is that the reduction was so small despite an unemployment level of 11%, factory utilization rates down to 67% of capacity, and basic industries and home consumption at Depression levels.

The upward turn this year, while it probably won't exceed 4% in real terms, should be steady rather than the up-and-down cycles we have experienced over the past two years.

There were bright spots throughout 1982 which, taken together, will contribute strongly to this year's recovery. The consumer price index (CPI) has been dropping steadily from 12.4% in 1980 to 8.9% in 1981 and about 6% last year. It should hold in the 5% to 6% range throughout 1983. It should also be noted that federal economists are trying to deal with the effects of home purchases, mortgage rates, and auto purchases on the CPI as now constituted because, in reality, these are not everyday expenditures for the bulk of the population.

Interest rates, both short and long term, also have been coming down. The prime rate, at 11% early in 1983, was down substantially from the 16.75% of a year earlier. Rates for treasury bills stood at 7.9% early in 1983, down from 12% a year earlier. The discount rate at which banks can borrow from the Federal Reserve was 8.5%, down from 12% a year earlier.

Importantly, home mortgage rates have come down to an average of 12.74% in early March from a mid-1982 figure of 15.75%. They can be expected to creep a bit lower, due in part because world oil price cuts have dampened investors' inflation expectations and, in part, to the dramatic drop in business borrowing — about $80 billion — during the last half of 1982.

In the view of many economists the looming federal deficit, which could reach $200 billion in fiscal 1984, should not be a threat to lowered interest rates this year. And if the economy recovers as expected, that deficit could be shaved to a more tolerable $150 billion to $165 billion.

A preliminary examination of the drop in world oil prices, most of it already in place before it was made official in mid-March, would indicate that it's a two-edged sword.

It will mean marginally lower oil and gasoline prices at home and, because it will help harden the currencies of foreign competitors, it should

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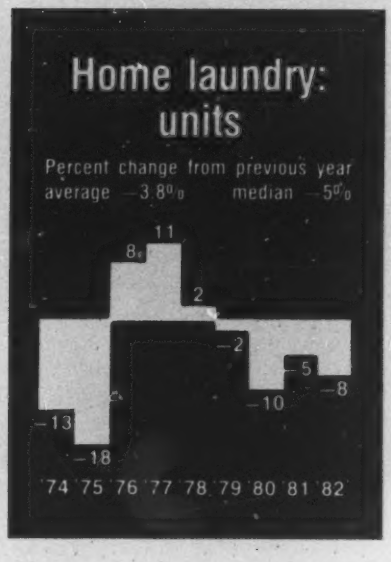
**The base year for the indexed charts in this year's Statistical Panorama has been changed from 1967 to 1977.**

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help U.S. exports. But because of the costs associated with recycling the debts owed American banks by oil producers, oil prices still will be higher than they would otherwise be in a free market. It must be remembered, too, that oil producers have been among the best customers for U.S. manufactured goods, including air conditioning and refrigeration equipment.

Both consumer per capita disposable income and average weekly earnings, expressed in real terms, held even in 1982. Consumer installment debt increased by only 3% in current dollars and so declined in real terms. The personal savings rate in the fourth quarter of 1982 was 5.8%, down from 6.5% a year earlier — a figure interpreted by some as the first sign in a long while consumers are ready to spend.

Consumer confidence has shown solid gains early in 1983, according to both Conference Board and University of Michigan consumer surveys. Said the Conference Board's executive director Fabian Linden:

"The most encouraging signal in these new readings is the rise in consumer expectations, which has proven to be a highly reliable indicator of future economic events.

"Consumer confidence now has substantially recovered from its depressed levels of last fall. Latest findings strongly suggest that the recession is behind us and that the economy could well be in a recovery phase by the second quarter of this year."

# Air conditioning

Although there is no denying that the 21% drop in unitary air conditioner shipments last year was a reflection of the difficult times experienced by all segments of the industry, its severity was cushioned in many respects by the fact that manufacturers, wholesalers, and contractors were well prepared.

In fact, when adjustments are made for inventory, the drop was more like 15%. If there were surprises, it was that President Ronald Reagan ignored the pleas of the home building industry early in 1982, an action we estimate cost this industry more than 200,000 unitary sales, and the low ebb of consumer confidence that caused thousands of homeowners to put off fixing or replacing failed equipment during the latter part of yet another relatively cool summer.

Total shipments of U.S. unitary air conditioners and heat pumps in 1982 decreased by 21.4% to 1,861,243 units from the previous year's total of 2,367,483 units, according to the Air-Conditioning and Refrigeration Institute (ARI). The major cause of the drop was a new home market that continued to be devastated by high interest rates.

These figures do not include air conditioning units and air-to-air heat pumps shipped to foreign markets in 1982. Although final figures were not available, shipments to overseas markets through the first 11 months of last year were running 25% behind 1981 shipments. For the full year, it would appear that exports last year would total 97,500 units, down 25% from 1981's total of 130,000 units, which was near the industry average for the past decade.

It must be remembered also, that these export figures include only those units shipped directly to overseas markets by oem's (original equipment manufacturers) and include few, if any, units shipped by distributors or contractors.

Of the 2,367,483 units shipped in 1981, about 77% — or 1,822,900 units — were for residential applications, and 23% — or 544,600 units — were for commercial applications. This is a slight deviation from the 80%-20% split experienced in 1980, but is in line with the 78%-22% split that has held sway for the past decade.

If we accept that the same split held true for 1982, then 77% — or 1,433,100 units — were destined for residential applications and 23% — or 428,000 units — were destined for commercial applications.

The unitary category includes electric air conditioners, gas air conditioners, air-to-air heat pumps, and rooftop equipment. It does not include packaged terminal air condi-

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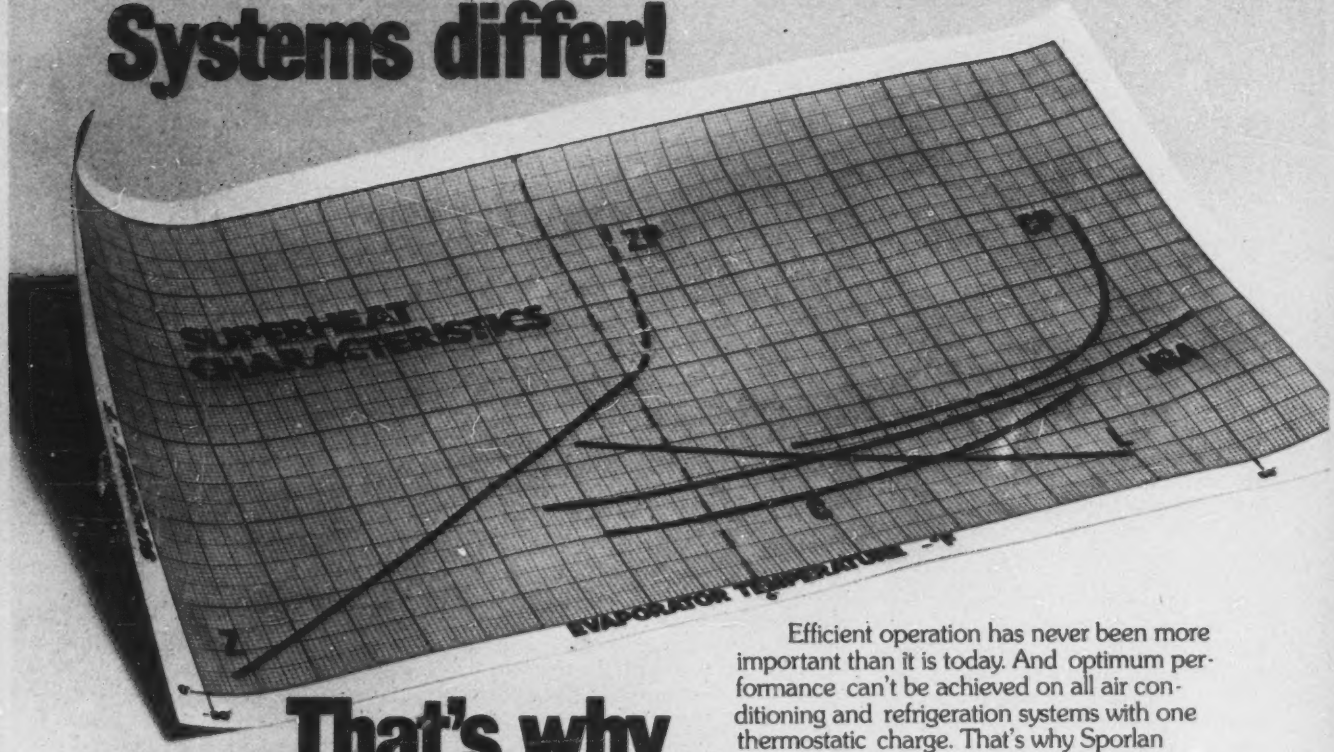
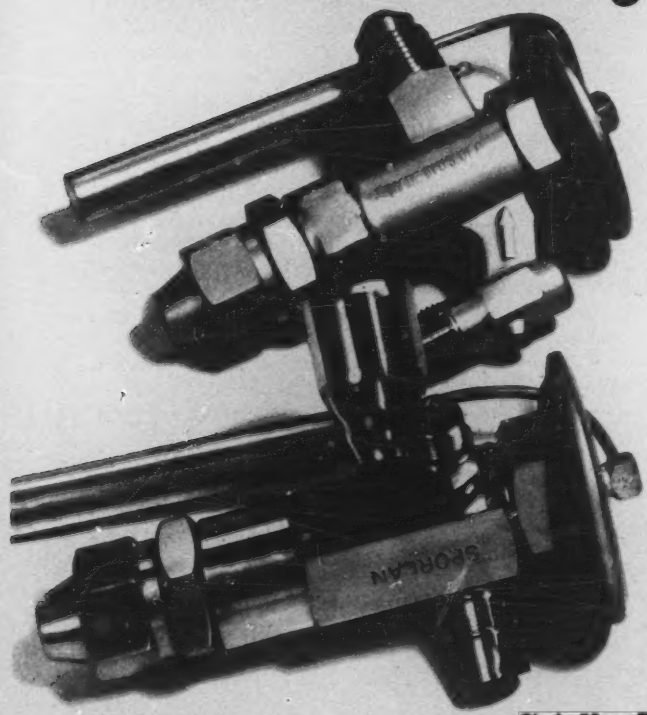
**Each Statistical Panorama includes the latest data available. Sources frequently revise their previous year's figures, which explains apparent discrepancies between the latest and earlier published data. Where sources give significantly varying information, that data is mentioned.**

# Systems differ!




# That's why selective charges are necessary.



Efficient operation has never been more important than it is today. And optimum performance can't be achieved on all air conditioning and refrigeration systems with one thermostatic charge. That's why Sporlan continues to offer a full line of TEV's with selective charges.

**Air Conditioning and Heat Pump Temperature Range**

**CP** Ballasted, pressure limit (MOP) type charge utilizes the stabilizing effect of the FlowMaster® element.

**VGA** Best anti-hunt type charge also uses the FlowMaster® element.

**Commercial Temperature Range**

**C** "Cross Charge" with a flat superheat characteristic so desirable for medium temperature applications.

**L** "Liquid" charge employs the same refrigerant in the element as used within the system and offers unique operating characteristics.

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**Z** "Cross Charge" with a decreasing superheat characteristic so important on applications below 0°F.

**ZP** Pressure limit (MOP) "Cross Charge" offers same operating characteristic as the "Z."

**X** "Cross Charge" with similar characteristics as the "Z" for temperatures below −40°F (not shown above).

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tioners (ptac's), packaged terminal heat pumps, room air conditioners, heat pump water heaters, or water-source heat pumps.

### Inventory

The inventory of unitary air conditioners at the end of 1982 was 630,000 units, or 29.5% of shipments last year. This compares to 790,000 units, or 33% of shipments, at the end of 1981. It's worth noting, too, that the 616,000 units in inventory at the end of 1980 represented 38% of shipments. The end-of-1982 figure, which represented a 20% drop from the previous year's total, was just below the 30% to 33% range considered normal throughout the industry's history.

Of the total end-of-1982 inventory, an estimated 294,000 units, or 46.7%, were at the factory, and 336,000 units, or 53.3%, were at the distributor level. This represents a decrease of 121,000 units at the factory and 39,000 less units at the distributor level when compared with prior-year experience.

The trend toward reduced inventories began in the fourth quarter of 1981 and continued throughout most of last year. Late in the year, however, and in the first quarter of 1983, a rebounding housing industry began putting pressure on this reduced pipeline count, a condition that caused many manufacturers to rehire laid-off workers and component shipments to improve dramatically.

### Capacity mix

An indication of capacity mix for 1982 unitary air conditioners, and how it compares with 1972 experience, follows.

| | % 1972 | % 1982 |
|---|---|---|
| Under 1.8 ton | 16 | 12 |
| 1.8 ton to 26,999 Btu/h | 23 | 20 |
| 2.25 ton to 32,999 Btu/h | 17 | 17 |
| 2.75 ton to 38,999 Btu/h | 22 | 22 |
| 3.25 ton to 43,999 Btu/h | 6 | 7 |
| 3.67 ton to 53,999 Btu/h | 7 | 8 |
| 4.5 ton to 64,999 Btu/h | 6 | 9 |
| 5.4 ton to 96,999 Btu/h | 1 | 2 |
| 8.1 ton and larger | 1 | 3 |

In the 1981-82 figures, small but significant increases were noted in these ARI-supplied figures at both ends of the spectrum. The News interprets these as reflecting the growing strength of the multifamily home market at one extreme and a commercial market that did not begin fading until late in the year at the other. Central systems for all phases of the single-family home market did not fare well.

### Installed value

The installed value of unitary air conditioning equipment put in place in 1981, the latest year for which figures are available, was $6.811 billion, up 31.3% from the $5.186 billion installed in 1980, according to ARI.

Commercial installations accounted for $2.56 billion, or 37.5% of the total in 1981, and residential installed value amounted to $4.25 billion, or 62.5% of the total, according to estimates compiled by ARI's Business Research Department from information supplied by manufacturers.

Installed value covers the cost of unitary air conditioning equipment as shipped from the factory together with labor, ductwork, registers and grilles, thermostatic and other controls, electrical wiring, and other components of the system that are installed by contractors.

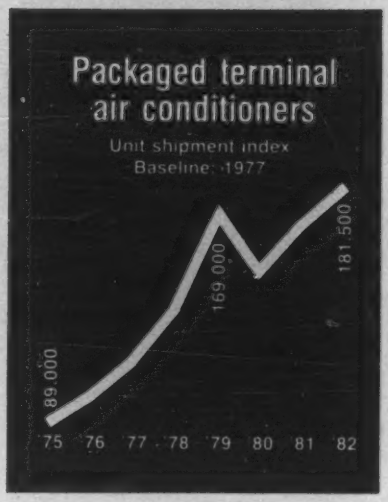
The installed value of field-engineered air conditioning systems put in place in 1981 was estimated at $3.669 billion, an increase of 6.7% over the 1980 figure of $3.438 billion.

The combination of the two installed value figures for 1981 was $10.48 billion for all air conditioning put in place in the U.S. with the exception of room air conditioners. This represents a 21.5% increase over the 1980 total of $8.624 billion.

In determining the installed value of field-engineered systems, ARI estimates that only 7.5% of the cost of the system is represented by the refrigeration machine. The remaining 92.5% represents air-handling equipment, labor, ducts, pipes, controls, and all other installation costs.

### Ptac's

Packaged terminal air conditioner (ptac) shipments which suffered a precipitous drop in 1975 and another, less severe, drop in 1980, increased by 9.7% in 1982 to 181,500 units. The previous-year figure was




165,500 units. Shipments in 1975 amounted to only 89,000 units.

The recovery of ptac's was a continuing reflection of strong office building, nursing home, and hotel markets during the past two years as well as the growing strength of heat pump versions. Although late-year bookings still showed marginal increases, the slowing pace of commercial construction will mean this category will do well to hold even in 1983.

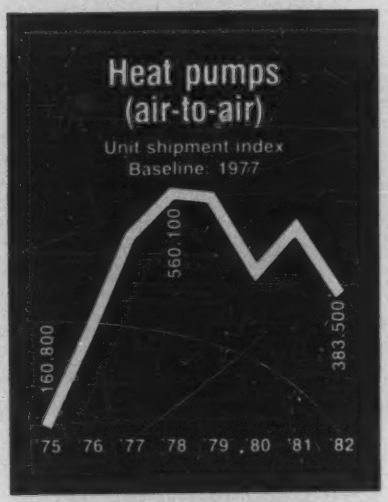
Although The News believes that more than one-third of ptac's shipped in 1981 were packaged terminal heat pumps, it also believes that the proportion slipped last year to less than 20%, putting more than a little doubt on an earlier industry prediction that heat pump units would grow to two-thirds of the total within the next three years.

It might be noted that, in 1981, the first year the Bureau of the Census published figures for packaged terminal heat pumps, it showed 32,439 such units shipped in addition to 149,061 standard-cooling ptac's. The census numbers vary considerably from those collected by industry.

Ptac's are self-contained refrigeration cycles capable of being combined with a heat source, usually electric resistance heat or hot water coils, in the same through-the-wall cabinet. The heat pump version uses outdoor air as a primary heat source and may or may not contain supplementary hydronic or electric resistance heat.

### Heat pumps

Air-to-air heat pump shipments, which rose from a plateau of about 120,000 units in 1973 to a peak of 560,000 units in 1978, thanks in large measure to natural gas curtailments, suffered badly in 1982. Shipments declined by 24% from a 1981 total of 504,786 units to 383,515 units last year.




The sharp drop in heat pump shipments last year is due in large measure to the decline in the housing market, which dropped 2.2% from 1981's miserable performance to just over a million units. Too, the heat pump still is primarily a new single-family home product, and shipments were further degraded by the fact that single-family starts declined by 6.3% last year while multifamily starts increased by 5.5%.

Another major factor in the decline of heat pump shipments was the continued low consumer confidence in the economy and a generally mild winter that combined to reduce the number of add-on heat pump installations on existing gas and oil furnaces to only about half that expected by The News — about 39,000 instead of an expected 72,000 units.

In fact, the penetration of heat pumps into new single-family homes (see "Comfort in construction") moved up a couple of notches from an already respectable 24.2% of new single-family homes completed in the first nine months of 1981 to 26.6% of those completed during the same period last year.

A substantial improvement in housing starts this year, together with continued natural gas price escalation in key markets and continuing media attention to gas price decontrol issues, should mean a dramatic recovery for heat pump shipments this year. We're forecasting an increase of 25% to 480,000 units. It could be more.

The air-to-air heat pump figures included in the unitary statistics supplied by ARI do not include all heat pumps made in the U.S. To these should be added ptac's in a heat pump configuration, water-source heat pumps (both earth-coupled and continuous loop), air-to-water heat pump water heaters, and room unit heat pumps.

The Association of Home Appliance Manufacturers (AHAM) does not break down its shipment figures into air conditioner and heat pump categories, nor does the Bureau of the Census. The News estimates the heat pump share to be in the order of 15% to 20%.

### Water-source units

Water-source heat pump shipments, until five years ago, amounted to a small, steady category of usually less than 40,000 units a year. Most were destined for the deep South, particularly Florida. Equipment and system design advances, together with a growing acceptance in the North, lead many now to feel they may still be at the bottom of a substantial growth curve.

These units are not included in the unitary total (which includes only air-to-air heat pumps). Some are used on closed loops coupled to a small boiler and cooling tower; some use water from a well, a pond, or the ocean; and others used closed ground loops filled with a heat transfer liquid to provide comfort heating and cooling.

Shipments of water-source heat pumps rose steadily from 40,000 units in 1977 to a peak of 95,000 units in 1981. Shipments last year, however, decreased by 7.4% to 88,000 units. It was more a reflection of reduced consumer spending last year, we feel, than any disenchantment with the system.

The water-source category includes three classes of systems. The bulk of the shipments are units designed for the southern market which operate on ground water or closed loops in the 60°F to 90° range. The fastest growing segment is a class of unit designed for northern climates that can accept water sources as cold as 45°. It may be a heating-only unit designed to use well-water coils for comfort cooling. A third class uses vertical or horizontal water-glycol loops with temperatures that can go down to 26°.

The northern water-source units are growing steadily in areas where ample ground water is available. Until the last few years their markets were limited to rural and exurban areas beyond natural gas mains. The use of vertical or horizontal closed ground loops, however, provides the potential for invading urban markets. Solar assist also is a practical option for closed-loop systems.

### Heat-pump water heaters

The nation has traditionally heated its domestic hot water in natural gas-fired and electrically heated storage tanks. A few are heated with LP gas or oil. Increasing energy prices have motivated homeowners to add extra insulation to storage tanks, add solar assist, and add desuperheaters in areas where the operating hours of air conditioners or heat pumps can justify the cost.

The air-to-water heat pump, with an installation cost more than twice that of an electric water heater, has entered the marketplace in the last three years to compete with electricity, natural gas, or oil where operating cost savings in the order of 40% are claimed.

There were early hopes that heat-pump water heaters would rival the two million-plus shipments of electric domestic hot water heaters within five years or so but there are no signs of that happening. Al-

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though there are no statistics for this product, some feel that the 1982 market probably did not top 25,000 units.

The increased reliability and dramatic efficiency improvements in air-to-air heat pumps, together with the potential of their water-to-air and air-to-water cousins, add to a diverse and solid base for future heat pump expansion. The proportion of air-to-air units with cooling Seasonal Energy Efficiency Ratios (SEER's) of 7.5 or more has risen dramatically from 54% in 1980 to 72% in 1981 and 75% last year. Penetration into new single-family housing (26% last year) continues strong even though natural gas is widely available.

In addition, the heat pump now is a practical replacement for central air conditioners in most areas of the country for homes heated with any fuel. This includes natural gas, where sharp price jumps and threatened decontrol of prices, have prompted many homeowners to hedge their bets.

### Rooftops

Indications are that commercial rooftop shipments declined by only 6% in 1982. The reason we say "indications" is that no official sources attempt to classify rooftops.

Commercial rooftops really represent a market application of several different products rather than a single product type that can be identified statistically.

For example, all-year units are identified by the Bureau of the Census and clearly imply a heating capability. However, both single-package and split-system rooftops, although they may have been shipped (and counted) as cooling-only units, may have a modular heating section added in the field.

Too, heat pumps imply one and usually two methods of heating as well as cooling. Another complicating factor is that small, all-year rooftops are applied in more residential than commercial situations.

In the past, we have attempted to apply known ratios from the year-previous Bureau of the Census report to the current ARI-supplied totals for the last complete year of shipment figures. These ratios were clouded, however, by the need to remove exports and other differences to make the two sets of figures agree as much as possible.

Last year, however, The News obtained a breakdown of ARI shipments according to broad system types by size and according to the residential-commercial split. By applying the 1980 experience ratios to the 1982 shipment figures, we find there were 399,800 commercial units shipped in 1982, down 9% from the 438,700 commercial units shipped in 1981.

We also find that, in 1982:

- 127,300 were split systems, of which 30,500 units had capacities in excess of 5 tons.
- 120,200 were all-year single packages, of which 27,300 units had capacities in excess of 5 tons.
- 89,300 were cooling-only air conditioners, of which 24,600 units had capacities in excess of 5 tons.
- 1,000 were multizones, all of which had capacities in excess of 5 tons.
- 62,000 were heat pumps — 34,600 single packages and 27,400 split systems — of which 9,600 units had capacities in excess of 5 tons.

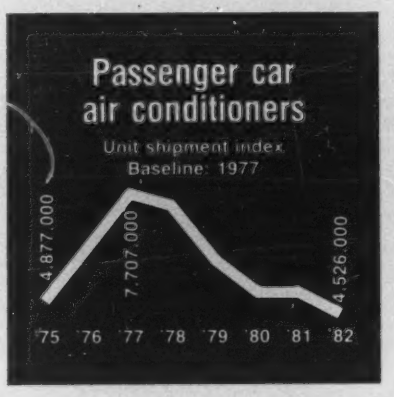
Taken together, 97,075 were commercial rooftops with capacities of more than 5 tons in 1982. The total is 6.2% less than the 103,579 units shipped in 1981. The stability of this market in recent years is shown, at least in part, by the 99,472 units shipped in 1980.

Of the 97,075 commercial rooftops of more than 5 tons shipped last year, 64,966 had capacities ranging from 5 to 11 tons, 21,640 units had capacities ranging from 11 to 20 tons, and 10,469 units had capacities of more than 20 tons.

### Mobile air conditioners

According to Ward's Automotive Reports, there were 4,526,242 factory air conditioning units installed in U.S. domestic automobiles during the 1982 model year, down 10.7% from the 5,067,613 factory installations made in 1981.

The decline was not as great as for overall U.S. car production, which dropped by 15.4% from 6,639,954 units in the 1981 model year to 5,616,069 units last year. The difference can be accounted for by the increase in air conditioner penetration from 76.3% in the 1981 model year to 80.6% last year. The penetration of factory installations was 73% in 1980.




Looking at the detailed breakdowns, almost all of the full-size and luxury cars are air conditioned at the factory while only 30% to 40% of the smallest cars are equipped with factory air conditioning. It would appear, however, that three-quarters of the compact and intermediate cars are air conditioned.

It might be noted also that, of the 1,949,489 U.S. domestic light trucks produced during the 1982 model year, 1,024,996 of them — or 47.4% — were equipped with factory air conditioning.

Of the 1,076,152 cars imported into the U.S. during the 1982 model year, 417,812 of them — or 38.8% — were equipped with air conditioning at the factory. This is a switch from the practice of only a few years ago when air conditioning usually was added after the cars arrived in the U.S.

**Aftermarket shipments** of auto air conditioners continued to decline

in 1982, a reflection of the depressed auto, farm tractor, and truck markets. Although no official statistics are gathered, the International Mobile Air Conditioning Association estimates last year's shipments in the range of 450,000 to 500,000 units, down substantially from the 1978 figure of about one million units.

Manufacturers of aftermarket auto air conditioners reported that business began picking up early in 1983 and several have rehired many workers laid off earlier. The improvement has been in the auto and truck business. Air conditioners for farm equipment continues to be depressed.

Industry observers estimate that Japanese compressors now are used in more than 80% of aftermarket air conditioners produced in the U.S. In addition, there is an increasing application of Japanese expansion valves and other key components.

In contrast, one major U.S. manufacturer has introduced a new automotive compressor and a large oem is considering releasing its new compressor, destined for 1984 models, to other manufacturers. Another domestic manufacturer, which sells to both the oem and aftermarket, is distributing a Japanese compressor along with its own model produced in the U.S.

Although 1982 figures are not available, the Bureau of the Census reported that 7,283,744 automotive air conditioning compressors were shipped from U.S. factories in 1981, up 3.5% from the 7,035,148 automotive compressors shipped the previous year.

The Census Bureau also reported that 822,574 mobile air conditioners for trucks, agricultural, and off-road construction vehicles were shipped in 1981, up 7.5% from the revised figure of 764,942 units shipped in 1980. Similarly, the bureau reported that 6,079,517 mobile air conditioning systems for passenger cars were shipped in 1981, up 3.9% from the revised figure of 5,852,328 units shipped the previous year.

A new census category revealed that 66,773 air conditioners used in recreational vehicles were shipped in 1981, up 10.7% from the 60,301 units shipped in 1980, the first year these statistics were collected.

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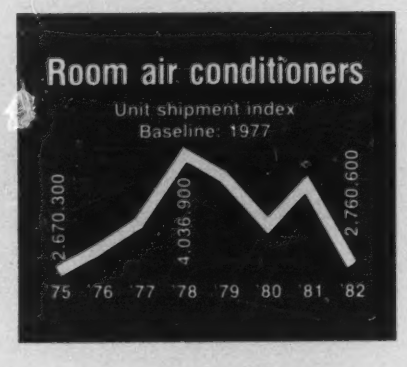
### Room air conditioners

Room air conditioner shipments declined by 25.2% to 2,760,600 units in 1982 from the 3,692,500 units shipped in the previous year, according to the Association of Home Appliance Manufacturers (AHAM). The total is close to the 2.67 million units shipped in 1975 and far below the five million-plus years of the early 1970's.




Not to be forgotten is that 480,100 room air conditioners were exported last year, or 17.4% of total shipments. This compares to 713,000 room air conditioners, or 19.3% of total shipments, exported in 1981. That was the year the Japanese succeeded the U.S. as the world's leading exporter of room air conditioners. The 805,869 units exported in 1980 represented a previously normal 25% of total shipments.

See the "International" section for a listing of key export markets.

Contrary to the expectations of some, high energy costs have not caused consumers in significant numbers to switch from central air conditioning to the more selective room unit approach. Room units remain essentially an impulse purchase influenced more by hot weather than by any other single factor.

AHAM forecast an increase of 2% in 1983 shipments to 2.83 million units, a figure The News feels is a bit conservative. We are looking for a 5% increase to 2.9 million units. It could be a somewhat higher number if the summer proves unusually hot, but any major increase is hampered by continuing stiff competition in depressed foreign markets and only a modest economic recovery rate at home.

### Chillers

Although chiller shipments continued to decline in 1982 to 12,300 units, down 10.8% from the 1981 total of 13,790 units, it must be remembered that last year's figure was more in keeping with the 1976-79 plateau of about 12,000 units. The latter-day peak of 14,500 units in 1980 marked a brief return to the experience of the early 1970's.

The 3,600 centrifugal chillers shipped in 1982, down 16.3% from the 4,300 shipped in the previous year, reflected the growing weakness in the office building market and the continuing recession in Europe and Japan. The Middle East market, however, continues reasonably strong.

In 1982, there were 8,500 reciprocating chillers shipped, down 8% from the 9,250 shipped in 1981. Shipments of absorption chillers amounted to only 200 units last year, down 16.7% from the 240 units shipped in 1981. Almost half of the absorption units produced in the U.S. last year were exported.

Although 1982 figures are not available, the Bureau of the Census reported that 5,320 screw compressors were shipped in 1981, up 4.5% from the 5,089 units shipped in

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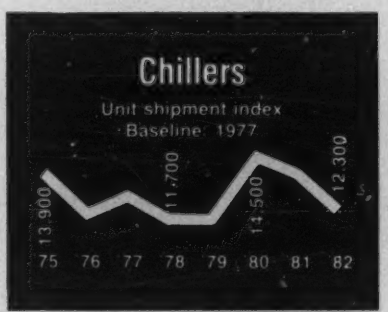

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1980. These figures are believed to include only those screw compressors formerly grouped with reciprocating chiller packages and not the large-tonnage units still believed to be grouped with centrifugal chillers.

The Census Bureau reported that 1,808 ammonia compressors were shipped in 1981, down 2.8% from the 1,860 units shipped in 1980.

The outlook is for a drop in chiller shipments in 1983 of about 5% to 6%. The office building market, which boomed for two years, has been slipping steadily since the third quarter of 1981 and, probably, will not turn up again for another two years. Other markets, including exports, are expected to show little, if any, improvement.

A breakdown by chiller type follows:

| Year | Recip. | Cent. | Abs |
|---|---|---|---|
| 1970 | 10,300 | 4,150 | 1,000 |
| 1971 | 10,000 | 4,000 | 900 |
| 1972 | 10,000 | 3,000 | 900 |
| 1973 | 10,400 | 4,100 | 800 |
| 1974 | 11,000 | 4,500 | 1,000 |
| 1975 | 8,250 | 4,950 | 700 |
| 1976 | 7,600 | 3,400 | 500 |
| 1977 | 8,900 | 3,000 | 450 |
| 1978 | 8,100 | 3,350 | 370 |
| 1979 | 8,100 | 3,350 | 280 |
| 1980 | 9,650 | 4,600 | 280 |
| 1981 | 9,250 | 4,300 | 240 |
| 1982 | 8,500 | 3,600 | 200 |

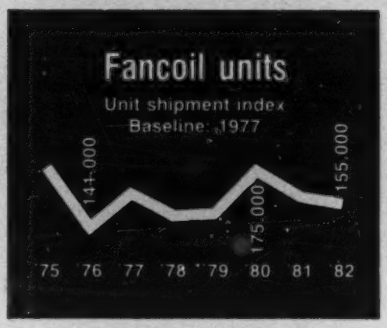
### Evaporative condensers

Shipments of evaporative condensers in 1981, the latest year for which figures are available, amounted to 2,859 units, a change of less than 1% from the 2,881 units shipped in 1980, according to the Census Bureau.

### Fancoil units

Domestic shipments of fancoil units in 1982 amounted to 155,000 units, down 1.9% from the 158,000 units shipped in 1981. This product tends to follow chiller shipments by about six months.

Bureau of the Census figures, which include exports as well as those units destined for the domestic market, show that 253,832 units were shipped in 1981, the latest year for which figures are available. This




was 3.5% more than the 245,127 units shipped in the previous year. Vertical units accounted for about two-thirds of total shipments in both years.

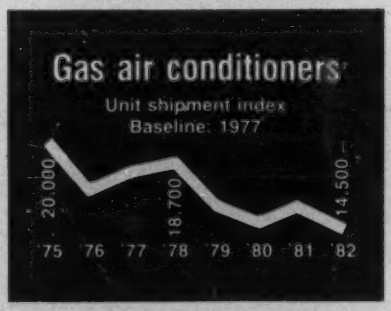
### Gas air conditioners

Shipments of gas air conditioners, which became popular in many areas during the 1960's until natural gas curtailments restricted the market, continue to do reasonably well in Sunbelt areas where cooling hours are long and electricity is relatively expensive. The market has been broadened in the last decade to include solar-fired units.

Last year, however, shipments of gas air conditioners slipped by 9.3% from 16,000 units in 1981 to 14,500 units last year.

Water- and steam-fired absorption air conditioners, some used in conjunction with solar-assisted comfort cooling systems, are included in these figures. Also included are commercial units of up to 25 tons' capacity, and export units.

Arkla Industries, Inc., the sole domestic producer of gas- and solar-fired equipment, also is developing a gas-fired absorption heat pump. Double-effect absorption cycles and heat pumps now under development

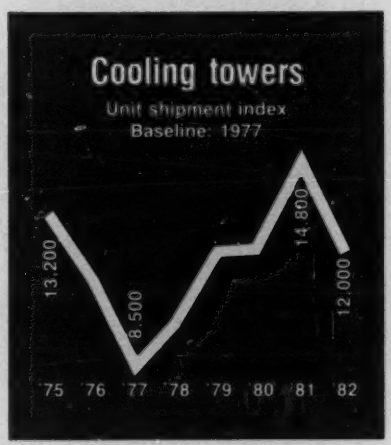



by Arkla and others can be expected to enter the marketplace within two or three years.

The company also announced, however, that it has discontinued the manufacture of water-cooled absorption air conditioners. They will be replaced by air-cooled models, the company said, because there are too few localities where natural water can be used in cooling towers without the necessity for troublesome water treatment.

### Cooling towers

The only figures available for cooling towers are those collected by the Bureau of the Census. In 1981, the latest year for which figures are available, the bureau reported shipments of 14,772 cooling towers, up 21.2% from a revised figure of 12,185 units shipped in 1980.




The News believes that shipments last year will reflect both the decline in office building construction and the decision by an absorption unit manufacturer to discontinue its line of water-cooled absorption units. Cooling tower shipment figures last year should have returned close to the 12,000-unit plateau.

### Induction units

The News has all but given up reporting this category because room induction units now are manufactured by only a few companies, and the Bureau of the Census has not reported on them for several years because of its disclosure rules.

In 1980, however, the bureau reported that 33,343 room induction units were shipped.

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# Refrigeration

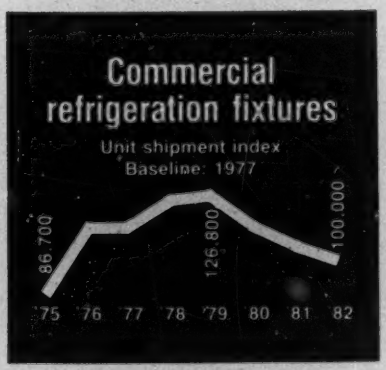
No reliable record of commercial refrigeration equipment shipments is available for 1982 because of a decision by the Commercial Refrigerator Manufacturers Association (CRMA) to overhaul its statistical program.

In 1981, the last year guidance from CRMA was provided, The News estimated that a total of 105,900 commercial refrigeration fixtures were shipped. The News estimates less reliably that, in 1982, total shipments declined 5.5% to approximately 100,000 units.

The estimate takes into account the healthy number of new store additions and renovations during the first half of 1982 and the 13% reduction in new construction for the last half of the year. With an upturn expected in the latter part of 1983, we expect shipments this year will hold even.

CRMA reports that the final form of the new statistical program still has to be determined but adds that it hopes to have several new categories which will be of more assistance to members. The previous program included reach-in, walk-in, and specialty standard-temperature cases as well as single-deck, multideck, and enclosed low-temperature cases.

The latest Bureau of the Census figures are contained in the 1977 Census of Manufactures. That report shows the following units were shipped: 74,000 standard-temperature reach-ins; 29,900 low-temperature reach-ins; 11,200 closed meat cases; 26,000 open single-level cases; 31,700 open multilevel cases; 32,000 single-level frozen-food cases; 11,000 multilevel frozen food cases; and 6,400 closed frozen food cabinets.




In the same year, The News estimated that a total of 114,100 fixtures were shipped. We feel that the federal figures include several firms who do not participate in industry statistical programs and that the Census Bureau figures also include some restaurant and hotel equipment.

The supermarket's share of food store sales has increased steadily from 70.1% in 1972 to 86.9% in 1981, according to Chain Store Age, yet the number of food stores has declined from 246,800 to 192,443 in the same period. In 1981 there were 30,201 supermarkets, of which two-thirds were owned by chains; 132,638 captive supermarkets, grocery, and convenience stores; and 59,805 other stores which sold some grocery items.

The magazine estimated that, in the year ended June 1, 1982, there were 1,855 new supermarkets completed, up 106% from the 900 completed in the year-earlier period. In the same time frame, there were 2,368 supermarket remodels, down 26% from the 3,200 remodels completed in the year-previous period.

It is estimated that, in 1983, new supermarket construction will decline by 13% and remodels will continue at last year's pace.

For the 12 months ended June 1, 1982, U.S. grocery sales amounted to $228.3 billion and net profit before taxes averaged 1.4%. Chain Store Age estimates that 64.2% of the total was sold by chains with sales of more than $1 million; 20.1% was by independents with sales of more than $1 million; 10.8% was by independents with sales of less than $1 million; and 4.9% was by chains with sales of less than $1 million.

The average number of linear feet of shelf space devoted to frozen foods, for chains with more than $1 million in sales, has risen steadily from 290 ft in 1977 to 358 ft in 1981. The average number of linear feet devoted to refrigerated foods for the same type of store also increased from 229 ft in 1977 to 289 ft in 1981.

The typical new supermarket in 1983 will average 38,000 ft², nearly 12% larger than a year ago. Of those that will be built this year, 56% will be superstores (30,000 ft² or more and at least $5 million in sales); 29% will be combination stores (super stores that devote 25% or more of their space to general merchandise); 13% will be traditional supermarkets; and 3% will be no-frills warehouse-type stores. It is this latter group that most worries supermarket owners as a new and growing source of price competition.

The Food Marketing Institute (FMI) reported that, in 1981, the number of new supermarkets built amounted to 4.7% of the total. In the same year, 5.5% of the total number of supermarkets were closed. The average age of a typical supermarket was 11.5 years. Remodels, which average 6% of the total number of supermarkets, typically are done 10 years after a store is opened, or seven years after the last remodel.

### Refrigerators

Domestic refrigerator shipments totaled 4,363,500 units last year, down 11.7% from the 4,943,800 units shipped in 1981, according to the Association of Home Appliance Manufacturers (AHAM). The association is forecasting a 7.7% increase in 1983 to 4.7 million units.

Shipments of home freezers in 1982 amounted to 1,340,400 units, down 16.5% from the 1,605,400 units shipped in the previous year. The 1982 breakdown shows that 54% were chest-type freezers and 46% were uprights. The outlook for 1983 is for a 5.7% increase to 1,417,000 units.

### Unit coolers

Shipments of unit coolers declined 14.3% in 1982 to 141,600 units from a revised 1981 figure of 165,200 units. The revised figure for 1980 is 147,800 units.

It might be noted that the Bureau of the Census reported that 169,484 unit coolers were shipped in 1981, the latest year for which these fig-

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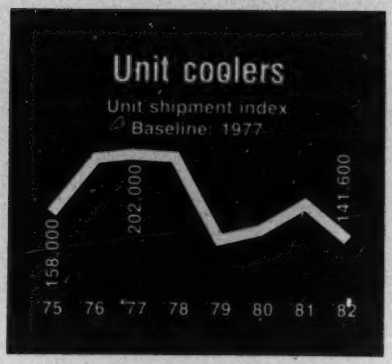
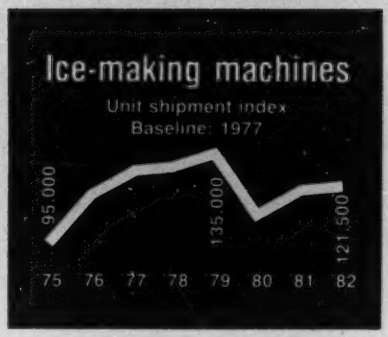



but larger warehouses continues. Too, many older warehouses have been taken out of service in recent years.

IARW reported that public freezer occupancy averaged 72% during 1982's peak fall season, 3% less than the 75% recorded in 1981 and 5% less than the record 77% set in 1979. The 1982 figure represents 4.5 billion pounds of frozen food. Public cooler capacity during the 1982 fall season averaged 63%.

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ures are available. The 1980 Census Bureau total was 175,371 units.

### Ice makers

Shipments of ice-making equipment increased by 2% in 1982 to a total of 121,500 units. This compares to a revised 1981 total of 119,400 units. Of the total units shipped last year, The News believes 72% were cubers, 18% were flakers, and 10% were miscellaneous and combination units.

The Bureau of the Census shows 191,010 ice-makers were shipped in 1981, the latest year for which these figures are available. The bureau said 166,725 units were shipped in 1980.

Investigation reveals no obvious reason for the marked discrepancy between industry and Census Bureau figures. Both include exported units and both are supposed to represent virtually all U.S. manufacturers. ARI has asked the Census Bureau to investigate the possibility of double reporting.

### Refrigerated warehouses

The International Association of Refrigerated Warehouses (IARW) reports that the 962 million $ft^3$ of public freezer space in place in 1981, a net increase of 5% over the 1979 total, represents 64% of the nation's total freezer capacity for goods held more than 30 days.

Although total freezer capacity has increased by 47% since 1965, public freezer space has increased by 79% during the same period, IARW reported. The trend toward fewer

# Heating

### Residential boilers

Gas-, oil-, and solid fuel-fired boiler unit shipments dropped by 7.2% in 1982 to 232,975 units from 251,022 units in 1981, according to The Hydronics Institute (HI).

Shipments of cast iron boilers decreased by 6.9% last year to 206,054 units from a 1981 figure of 221,354 units. Shipments of steel boilers declined by 9.3% from 29,668 units in 1981 to 26,921 units last year.

The surge in gas-fired boiler shipments of three years ago, brought about by high oil prices and the availability of natural gas after years of curtailment, has almost completely subsided. Oil prices peaked a year ago and have dropped by almost 8% while gas prices continue to escalate and the threat of decontrol by 1985 continues.

The gas share of the cast iron boiler market which had soared to 85% in 1980, settled back to a more normal 71% in 1981 and to 68.2% last year. It had dropped to 50% in 1977, the last year of widespread gas curtailments.

Oil's share of the cast iron boiler market in 1982 was 31.6%, or more than double the 15% share it had in 1980. The oil share in 1977 was

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## Estimated 1982 cast iron boiler shipments by thermal capacity

| Gross output, Btu/h | Steam | Water | Total |
|---|---|---|---|
| Less than 50,000 | 101 | 3,270 | 3,371 |
| 50,000 to 74,999 | 895 | 19,925 | 20,820 |
| 75,000 to 99,999 | 6,676 | 32,169 | 38,845 |
| 100,000 to 124,999 | 14,115 | 40,385 | 54,500 |
| 125,000 to 149,999 | 8,644 | 24,383 | 33,027 |
| 150,000 to 199,999 | 7,261 | 16,563 | 23,824 |
| 200,000 to 249,999 | 4,498 | 8,981 | 13,479 |
| 250,000 to 449,999 | 4,154 | 5,890 | 10,044 |
| 450,000 to 949,999 | 2,278 | 1,637 | 3,915 |
| 950,000 to 1,549,999 | 1,192 | 811 | 2,003 |
| 1,550,000 to and over | 1,456 | 770 | 2,226 |
| **Total** | **51,270** | **154,784** | **206,054** |

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49.5%. Boilers fired by solid fuels (coal, wood, or waste) amounted to 0.2% of total shipments in 1982, down slightly from the 0.3% share in the previous year.

The share of cast iron hot water boilers, at 75.1% in 1982, continued to hold constant, as did cast iron steam boilers at 24.9%. The shares in 1981 were 74% hot water and 26% steam.

**Radiation shipments** in 1982, according to HI, were: convectors 1,946,658 ft² EDR (equivalent direct radiation), down 9.7% from the 1981 figure of 2,154,615 ft² EDR; baseboard 30,390,013 ft² EDR, up 5.8% from the 1981 figure of 28,720,337 ft² EDR; and commercial finned tube 7,517,232 ft² EDR, down 4.5% from the 1981 figure of 7,868.320 ft² EDR.

Total radiation, at 39,853,903 ft² EDR last year, was up 2.9% from the 1981 total of 38,743,272 ft² EDR.

Total hydronic baseboard shipped in 1982 was 9,159,431 lineal feet, up 5.3% from the 8,698,671 lineal feet shipped in the previous year. This is a new HI breakdown.

Even with the increase, shipments of radiation products are far below those of only a few years ago. Total shipments in 1979, for instance, amounted to 57.8 million ft² EDR. The drop is a reflection of the fewer number of conversions (mostly from electric resistance baseboard) and a strong replacement market — about 85% of the total — in which radiation already is in place.

The recovery of the new home market together with the well-demonstrated trend among homeowners to upgrade their systems to get better efficiency should produce an overall increase in 1983 residential boiler shipment of about 8%.

### Residential furnaces

The recovery of **oil furnace shipments** from the fuel oil price-inspired slide of 1979 and 1980 continued in 1982 to 103,500 units, up 27.5% from the 81,200 oil warm air furnaces shipped in the previous year, according to the Gas Appliance Manufacturers Association (GAMA). Shipments in 1978 amounted to 228,300 units.

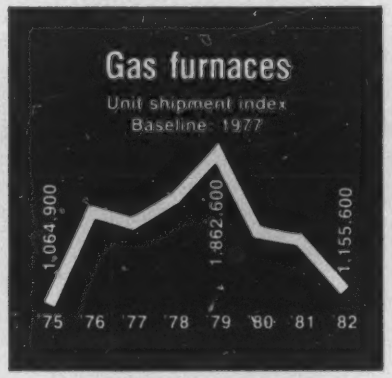
In November, 1982, GAMA forecast that oil furnace shipments would total only 83,300 units in 1983, a drop of 19.5% from last year's level. We disagree. We feel that the high proportion of replacements is reaching its normal stride and that the tide of wholesale conversions to natural gas has ended. An increase of about 8% to 112,000 units would be more in keeping with this product's prospects.

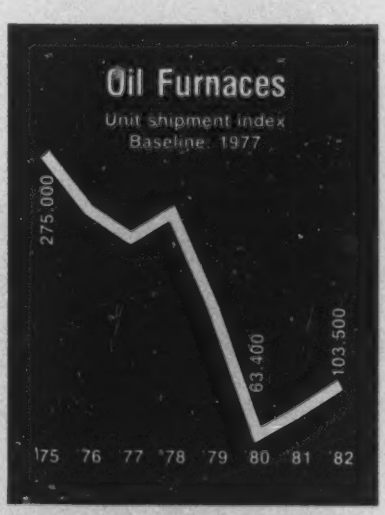
GAMA has advised The News that its figures have not been expanded to include the total industry. The Bureau of the Census reported shipments of 86,411 oil-fired furnaces in 1981, the latest year for which figures are available. In 1980, the revised figure was 75,162 units.

Fuel Oil/Oil Heat and Solar Systems magazine, whose estimates have closely paralleled those of the Census Bureau in recent years, estimates that 1982 shipments of oil furnaces amounted to 130,000, an increase of 18% over its estimate of 110,000 units shipped in 1981.

## Estimated 1982 cast iron boiler shipments by fuel

| Gross output, Btu/h | Solid fuel | Gas-fired | Oil-fired | Total |
|---|---|---|---|---|
| Less than 50,000 | — | 3,109 | 599 | 3,371 |
| 50,000 to 74,999 | — | 20,521 | 340 | 20,820 |
| 75,000 to 99,999 | 16 | 35,181 | 3,765 | 38,845 |
| 100,000 to 124,999 | 28 | 36,163 | 18,072 | 54,500 |
| 125,000 to 149,999 | 56 | 15,299 | 17,699 | 33,027 |
| 150,000 to 199,999 | 59 | 11,847 | 11,801 | 23,824 |
| 200,000 to 249,999 | 49 | 9,002 | 4,418 | 13,479 |
| 250,000 to 449,999 | 56 | 6,035 | 3,935 | 10,044 |
| 450,000 to 949,999 | 49 | 2,010 | 1,856 | 3,915 |
| 950,000 to 1,549,999 | 13 | 981 | 1,009 | 2,003 |
| 1,550,000 and over | 11 | 540 | 1,675 | 2,226 |
| **Total** | **337** | **140,598** | **65,119** | **206,054** |




**Gas furnace** unit shipments, because of the depressed level of housing starts and a much lower rate of conversions from other fuels than expected, totaled 1,155,600 units in 1982, down 18.4% from the previous year's shipment figure of 1,416,700 units. For comparison, gas furnace shipments in 1979 amounted to 1,862,600 units.

GAMA last November expected gas furnace shipments to recover by only 4.5% to 1,207,900 units but that forecast was made before the new home market demonstrated its solid recovery and before the impact of replacements for reasons of efficiency could be properly assessed. We feel a recovery in the order of 16% to 1,340,000 units is not only possible but probably is conserva-

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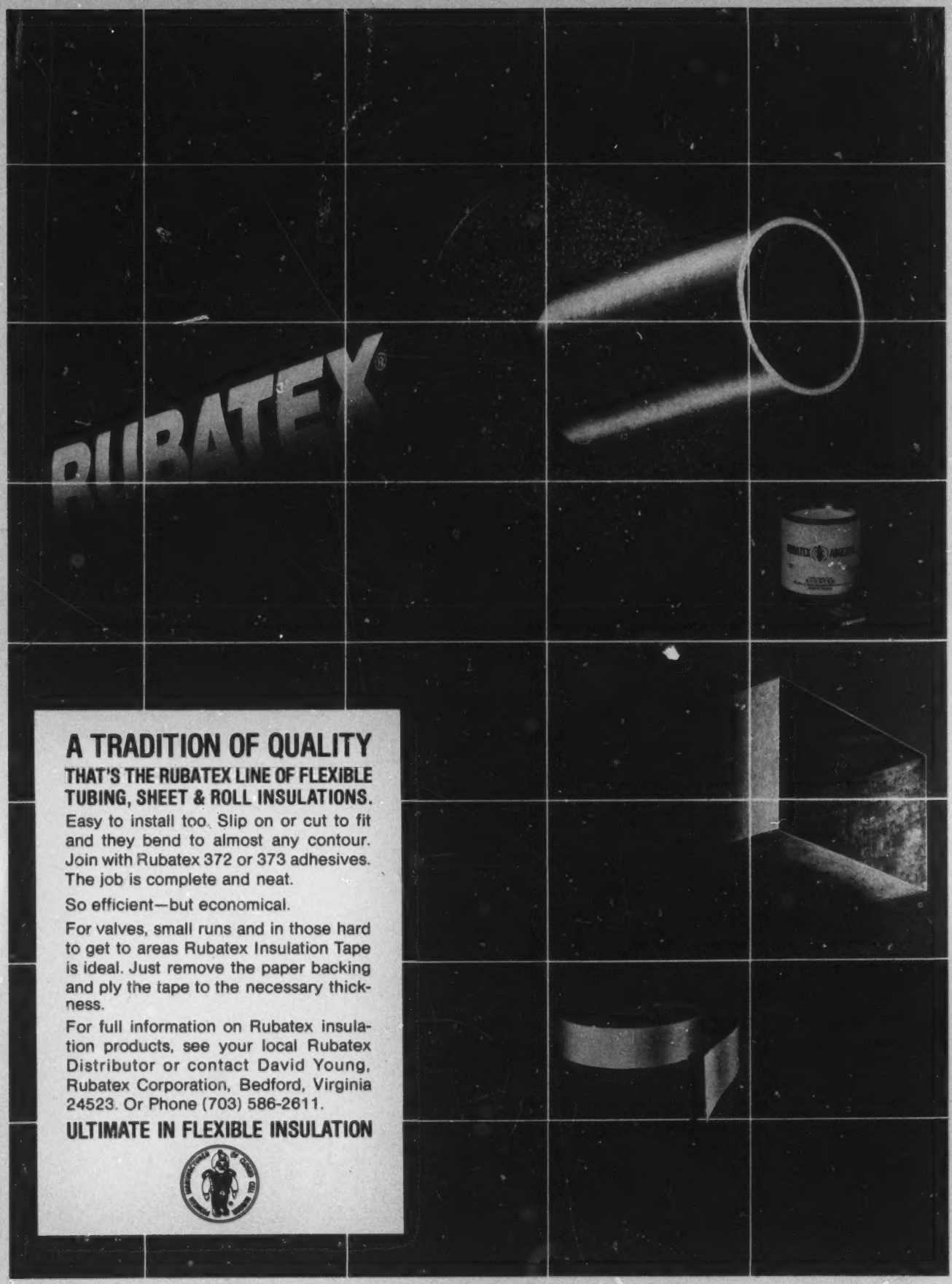


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tive. Shipment figures for December, 1982, and for January would, we feel, tend to bear out that argument.

Another powerful argument supporting a substantial increase is that industry inventories of standard-efficiency furnaces dropped to dangerously low levels in the first quarter of 1983 because manufacturers did not read the upturn quickly enough. They report they do not expect to catch up with demand until late April.

**Gas-fired unit heater** shipments dropped again in 1982 by 11.5% to 126,230 units from a 1981 total of 142,600 units. This market is expected to rebound by at least 10% this year to 139,200 units.

**Gas-fired duct furnace** shipments decreased by 3.2% in 1982 to 17,200 units. The 1981 figure was 17,675 units. Look for an increase of about 5% in 1983 to 18,000 units.

**Gas-fired wall furnace** shipments increased by 4.3% last year to 132,640 units. The 1981 figure was 127,160 units. GAMA expects wall furnace shipments this year to drop by 13% to 114,800 units.

Shipments of **recreational vehicle heating systems** declined last year by 5.5% to 109,350 units, according to GAMA. This compares to 115,671 units shipped in 1981, the first year these shipment figures were made available. This market is expected to increase by 20% this year to 130,800 units.

Early in 1981, GAMA estimated that the rate of conversions to gas from other fuels in 1982 would total 218,500 units. We doubt that last year's conversion rate was half of that figure because of factors that have arisen since the forecast was made.

The price of natural gas, which for many years has been the least expensive fuel throughout most of the nation, has been escalating dramatically in many prime markets. Annual increases of 20% to 50% have not been uncommon and, because of take-or-buy contracts with pipeline companies, many communities face continuing increases over the next few years.

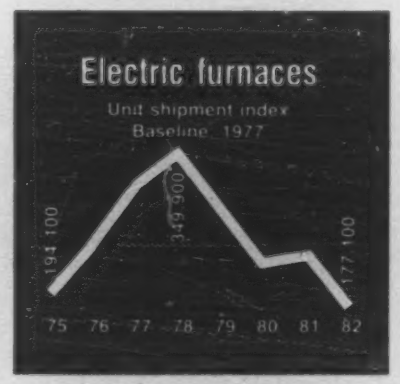
Added to this phenomenon, at a time when oil prices are declining, is the debate over whether federal controls on the price of natural gas should be lifted in 1985. It has become a high-visibility political issue and, we feel, has caused many homeowners to adopt a wait-and-see attitude toward conversions, an attitude that was supported by the fifth mildest winter (1982-1983) since records started being kept in 1933.

In terms of regulation, the Department of Energy has indicated that it plans to abandon mandatory minimum efficiencies for furnaces and boilers but has yet to issue a final rule. Some states, however, have banned standing pilots on gas-fired equipment. Meanwhile, GAMA has initiated a certification program for gas furnaces to complement the certification program for boilers HI has had in place for many years.

And although the gas-conversion market may have been a short-lived phenomenon, another market shows signs of expanding rapidly and affecting home heating markets for a much longer duration. It is the market for high efficiency (80% to 85% annual efficiency) and ultra high efficiency (annual efficiencies of more than 90%) furnaces.

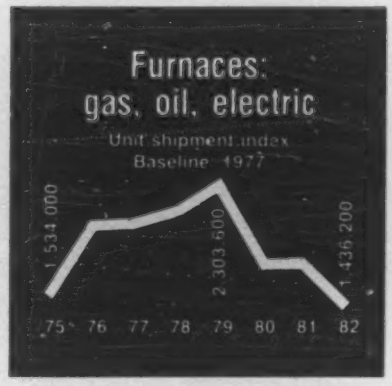
Only little more than a year old, this trend has shown surprising strength despite a weak economy. What is just as important, early experience indicates that three out of four of the ultra-high-efficiency units are replacing older furnaces in good working order as homeowners seek to develop a hedge against future increases in natural gas prices.

**Electric furnace** shipments, which held about even in 1980 and 1981, declined last year by 24.5% to 177,100 units as the depressed new home market finally took its toll.




Shipments in 1981 totaled 234,500 units. Its role as a backup heat source for air-to-air heat pumps and the recovery of the new-home construction market should produce at least a 20% increase in electric furnace shipments in 1983 to 212,500 units. We might add that this forecast is in sharp contrast to the 10% decrease forecast by manufacturers in November.

Total **gas, oil, and electric furnace shipments** in 1982 amounted to 1,436,200 units, down 20.6% from the previous-year revised total of 1,732,400 units. Because of the rebounding new home market, a steady replacement market, and increased sales for reasons of efficiency, we expect the total central furnace market to increase this year by 16% to 1,664,500 units.




In addition, the Bureau of the Census reported there were 6,239 **gravity warm air furnaces** shipped in 1981, the latest year for which figures are available. That represents a decline of 15.6% from the 1980 total of 7,392 units. **Furnaces fired by solid fuels** (coal, coke, wood) shipped in 1981 totaled 8,442 units, down 27% from the 11,550 units shipped the previous year. Shipments of **mechanical stokers,** at 2,340 units in 1981, increased by 91% over 1980 shipments of 1,225 units.

Similarly, the Census Bureau reported shipments of **electric unit heaters** in 1981 declined 34.4% to 56,949 units from a total of 86,758 units in 1980. **Electric infrared**

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**heaters,** at 29,397 units in 1981, were down 19% from the 36,304 units shipped the previous year. Shipments of **electric duct heaters** in 1981, at 36,077 units, were down 19.4% from the 44,783 units shipped in 1980. Shipments of **electric duct furnaces,** at 25,524 units in 1981, declined by 4.4% from the 1980 total of 26,706 units. Figures for electric boilers, believed to stand at about 900 units/year, and for electric baseboard were not available because of disclosure rules.

**Oil burner installations** in 1982 totaled 580,000 units, a drop of 6.5% from the 620,000 units shipped in the previous year, according to Fuel Oil/Oil Heat and Solar Systems magazine.

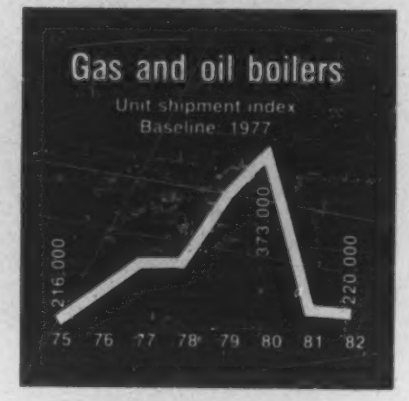
Of these, 24,000 units were installed in new single-family homes last year, up 20% from the 20,000 oil-fired systems installed in new homes in 1981. New home installations amounted to 85,000 in 1979.

Part of the reason for oil's sluggish performance in the new home market has been that its stronghold, the Northeast, had only an 11.9% share of the new home market in 1982 and only a 10.5% share in the previous year. Nationally, oil captured 2.7% of the new single-family home market last year and 5% of the multifamily market.

There were 545,000 replacement oil burners shipped in 1982, almost the same as the 549,000 replacement burners shipped in the previous year. The magazine estimates that about 80% of these were retention-head and other high-efficiency burners which were used to replace less efficient burners on a voluntary (to save fuel) or involuntary (breakdown) basis.

Conversions to oil from other fuels remained constant in 1982 at 11,000 units. The rate of conversions from oil to natural gas, believed to have approached 300,000 in 1980, slowed dramatically and are thought to have been less than 100,000 units in 1982.

It was estimated there were 98,000 oil-fired boilers shipped in 1982, up 3.2% from the 95,000 oil boilers shipped in 1981. There were 130,000 oil-fired furnaces shipped last year, an increase of 18% over the 110,000 oil furnaces shipped in 1981. For comparison, the 228,000




oil-fired furnaces and boilers shipped last year can be contrasted with a total of 425,000 units shipped in 1978.

The Bureau of the Census reports that 4,219 commercial oil burner units were shipped in 1981, the latest year for which figures are available. This total is down 38.1% from the 6,816 units shipped in 1980. Commercial replacement oil burner shipments in 1981 amounted to 37,560 units, down 35.7% from the 1980 total of 58,459 units.

The Census Bureau also reported that 3,668 oil-fired floor and wall furnaces were shipped in 1981, up 31.1% from the 2,797 floor and wall furnaces shipped in the previous year.

Shipments of **commercial-industrial boilers** of from 10 boiler hp to 1,000 boiler hp declined by 12.5% to 5,870 units in 1982, according to the American Boiler Manufacturers Association (ABMA). The 1981 figure was 6,710 units, which represented an almost identical drop from the 1980 shipment level.

ABMA reports that its members are experiencing the lowest level of boiler orders — about 20% of industry capacity for both utility and commercial-industrial types — since 1938. The association does not expect a turnaround until late in 1983, at the earliest.

The decline continued to be most severe for commercial watertube boilers, which declined by 14.6% from 4,050 units shipped in 1981 to 3,460 units shipped last year. Packaged firetube boiler shipments dropped 9.4% from 2,660 units shipped in 1981 to 2,410 units shipped last year.

Total shipments of burners of 400,000 Btu/h to 25 million Btu/h capacity dropped by 12.4% in 1982 to 16,200 units. The 1981 total was 18,500 units. The decline in burner units was as much a reflection of the slowing of conversions from single to multiple fuels, and from one fuel to another, as it was a reflection of general market conditions.

The commercial-industrial boiler market has been sliding steadily downward for five years, due in part to energy conservation measures within industrial plants and, in part, by the recession-caused excess capacity in many industrial plants that has allowed owners to postpone expansion plans. Government interventions, which helped initiate the decline five years ago, no longer is a significant factor.

Looking ahead, ABMA expects 1983 orders for industrial watertube boilers will reach 22 million pounds of steam, up 22% from 1982 but still far below industry capacity of 100 million pounds of steam. The association expects total orders for all classes of commercial boilers to reach 21,000 million Btu/h, an improvement of only 3% over the depressed 1982 level.

### Other heating equipment

In order to provide some perspective on the total comfort space heating scene, it might be wise to point out that, in 1981, the latest year for which figures are available, the Bureau of the Census reported shipments of:

- 279,137 airtight sheet-metal wood stoves, down 33.6% from the 420,076 units shipped in 1980.
- 143,349 circulating cabinet-type wood stoves, down 26.8% from the 195,749 units shipped in 1980.
- 35,231 radiant-type wood stoves, down 62% from the 93,303 units shipped in 1980.
- 25,294 other wood stoves, up 216% from the 7,998 units shipped in 1980.
- 297,887 fireplace inserts, down 28.5% from the 416,456 units shipped in 1980.
- 28,473 coal stoves, down 46% from the 52,698 coal stoves shipped in 1980.
- 217,278 vented gas stoves, down 31.8% from the 318,603 units shipped in 1980.
- 117,108 unvented radiant and

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Circle 62 on Reader Action Card

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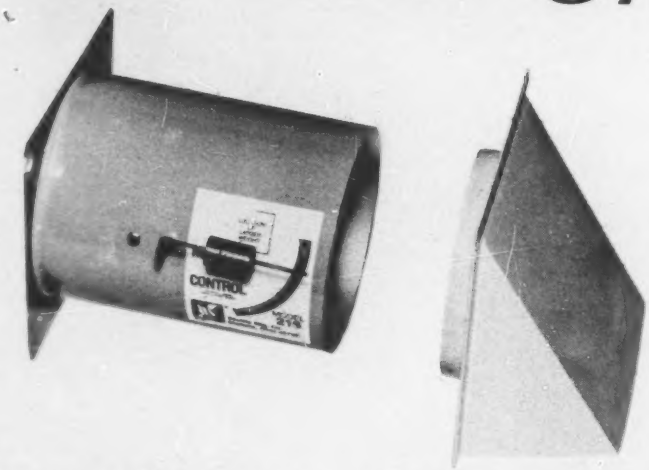


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other gas stoves, down 17.6% from the 142,163 units shipped in 1980.

- 2,876,910 portable fan-equipped space heaters, down 12.8% from the 3,300,741 units shipped in 1980.
- 1,320,034 portable "other-fan" space heaters, up 27.4% from the 1,035,845 units shipped in 1980.
- 2,326,198 fixed baseboard space heaters other than glass panels, down 11% from the 2,613,972 units shipped in 1980.
- 1,312,305 fixed space heaters other than baseboard, down 18.3% from the 1,606,539 units shipped in 1980.

Although many of these units find their way into vacation homes, which are not counted among the 80 million all-year housing units in the United States, the sheer volume of these numbers would appear to indicate that all-year homes also are being equipped with these area-heating devices in large numbers.

And although much of this equipment undoubtedly is being used in conjunction with thermostatically controlled central systems, the latest figures for new home construction penetration (see "Comfort in construction") would indicate that a good number are using primary fuels other than gas, oil, and electricity. "Other" fuels were listed for 6.3% of all homes completed last year, including about 10% of those in the Northeast and Midwest, and nearly that proportion in the West.

Even if homes in the South — where space heating requirements often are minimal — are removed, it would appear that more and more Americans are following those who live in much of the rest of the world by heating only those areas where concentrated activity is taking place to comfort levels and using central systems, if available, to maintain the rest of the house at minimum levels.

### Kerosene heaters

The latest generation of kerosene space heaters, with claimed efficiencies close to 100% and Underwriters' Laboratories (UL) labels as a buffer against growing safety and health concerns, has taken the country by storm.

From sales of only a few hundred in 1976 to an estimated three million units in 1981 and a like number last year despite a weak economy, these imported, largely Japanese-made units are used by most to heat areas of a home where activity is the greatest so that the central heating system can be turned down. This year's mild winter, coupled with poor economic conditions, put a damper on importer hopes to ship 5.5 million units this year.

The importers claim the portable units heat 92% of Japan's homes and burn without smoke or odor when the recommended super-refined kerosene is used. Although seven states have dropped restrictions on the home use of kerosene heaters since 1981, code authorities are clearly split on whether these unvented units should be allowed.

Most of the safety objections to kerosene heaters, such as shutting off should they tip over, have been answered by the new designs. Most have an extremely low center of gravity as well as safety shut-offs. There still are some concerns that hot surfaces could be touched accidentally by the very young and the very old, or that careless owners could fill their fuel tanks with gasoline instead of kerosene.

Health concerns involve the carbon dioxide and the oxides of nitrogen and of sulfur generated by the units, however efficient they may be. These health concerns probably will be explored in a $41-million libel suit brought against Consumers Union by Kero-Sun, Inc.

Meanwhile, Kero-Sun, which introduced the heaters to the U.S. mass market, continues to sell through its 58 distributors and 12,000 dealers. It has been joined by nearly 70 competitors, including some from Taiwan and South Korea.

### Wood-fired equipment

Surveys conducted by the Wood Heating Alliance (WHA) indicate that, in 1981, some 2,125,000 stoves were installed in U.S. homes. Of these, only about 20,000 went into new homes; the remaining 2.1 million stoves went into existing homes.

In addition, about 225,000 stoves were thought to have been fabricated by consumers and another 280,000 stoves were acquired used.

As for fuel use, WHA estimates that 69% of the stoves purchased in 1981 were intended for use with wood fuels. Another 28% could burn wood or coal, and 3% — mostly in New England — were designed to burn only coal.

Contractor involvement with stoves has been limited. WHA estimates that 77% of the stoves purchased in 1981 were installed by the purchasers at an average cost of $550 for stove and installation. Another 10% were purchased by consumers but installed by contractors and 12% were supplied and installed by contractors. The average cost of a stove together with professional installation was $825.

WHA also estimated that a total of 838,760 fireplace inserts were installed in existing fireplaces in 1981, the vast majority (710,570) in masonry types and the remainder in zero-clearance types. Of these, 58% were equipped with metal doors and 42% with glass doors.

The alliance estimated that nearly two-thirds of the inserts were installed by the purchasers at an average total cost of $1,000. Another 13% were purchased by the consumer and installed by a contractor and 20% were supplied and installed by contractors. The average cost of an insert and professional installation was $1,400.

Looked at nationally, 63% of new single-family detached homes built in 1981 were equipped with a fireplace, the same percentage as in 1976. Of the single-family attached homes, fireplaces were included in 56%, up from 48% in 1976. The number of fireplaces in low-rise multifamily homes in 1981 slipped to 22% from 26% in 1976.

WHA estimated that, in 1981, a total of 1,380,000 fireplaces were installed in the United States, 46% of them in new homes and 54% in existing homes. Of the total, slightly more than half were zero-clearance units.

The alliance estimated that one-third of fireplaces were installed by the purchaser at an average cost of $1,300. The average cost of a contract job was $1,800 with the exception of free-standing fireplaces, which averaged between $550 and $950 per installation.

Regionally, the highest inclusion of fireplaces in single-family detached homes was in the West South Central and Pacific regions, where more than 80% of new homes get

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fireplaces. One out of every five homes built in the Pacific region has two or more fireplaces. Only 51% of homes in the East South Central region gets a fireplace.

### Multifuel units

Although no statistics are available, it is estimated that about 12,000 multifuel furnaces and boilers now are being sold in the U.S. market, most of them going into new homes where the installed cost runs from $2,500 to $3,000.

The most popular combination, particularly in the Northeast, is wood and oil although wood also is used with LP gas, and even natural gas in the upper Midwest, and with electricity in the Northwest.

# Related products

Sales bookings for industrial air pollution control equipment dropped a precipitous 58.4% in 1981, the most recent year reported by the Industrial Gas Cleaning Institute (IGCI). The increase in 1980 was 38.6%.

Total new orders in 1981 amounted to $455 million, down from $1.092 billion in the previous year. The total represents 34 reporting companies, five less than the number reporting 1980 data.

Booking value of electrostatic precipitators, at $115 million, was down 30.2% in 1981 from the $164.8 million worth booked in 1980. The value of fabric filters, at $116.7 million, was down 45% from the previous year's total of $212.5 million.

Flue gas desulfurization equipment bookings of $184.4 million in 1981 were down a dramatic 72.2% from the 1980 booking total of $664.4 million. The level of bookings for this category in 1978 was $159.2 million, and in 1979 it was $404.5 million.

The value of gaseous controls bookings, at $1.8 million in 1981, was the same as the value for the previous year. Mechanical collector shipment values, at $13.1 million in 1981, were down 36% from the $20.7 million recorded in 1980. Wet scrubber bookings, at $23.2 million in 1981, were down 18% from the previous year's total of $28.3 million.

The IGCI statistics cover new orders for installations in the U.S. and Canada. All orders include bare flange-to-flange hardware with the exception of flue gas desulfurization equipment, which includes the total contract value.

### Power humidifiers

Comparatively mild weather in much of the country, pressures on discretionary income, and a depressed level of housing starts were the principal reasons cited for another poor year for power humidifiers, which declined by 11% from 387,200 units shipped in 1981 to 345,000 units last year.

This product, although primarily an add-on item, often is installed soon after a new or used home is purchased by people who, for reasons of health or comfort, feel they want the benefits of humidification.

It might be noted that the Bureau of the Census reported that, in 1981, a total of 394,615 humidifiers of all types were shipped by U.S. manufacturers. The bureau revised its 1980 humidifier shipment figure to 423,986 units. These figures, the latest available from the Census Bureau, represent the first two years the bureau has published figures for humidifiers.

An improving economy and a substantial increase in both new and existing home sales should help power humidifiers end the downward sales spiral. We are looking for an improvement of about 7% to about 370,000 units.

### Fans

With the exception of louvers, dampers, and shutters, shipments made by members of the Air Movement and Control Association (AMCA) showed declines in 1982 from the year-previous experience.

Centrifugal fan shipments in 1982 totaled $124,220,104, a decrease of 11% from the previous year's figure of $140,184,744.

Industrial axial and propeller fan shipments last year amounted to $56,867,239, down 13% from the $65,181,487 recorded in 1981.

The value of power roof ventilator shipments in 1982 was $52,034,093, down 6% from the 1981 total of $55,452,974.

Shipment values for louvers,

dampers, and shutters, at $51,270,031 last year, were 2% up from the total of $50,095,858 in 1981.

AMCA in 1978 eliminated fans shipped to the power generation market and placed them in another category which is not made public.

### Central station air handlers

As expected, shipments of central station air handlers dropped by 18.5% in 1982 to 53,000 units. The previous year's figure was 65,000 units. Look for a continued decline in 1983, although it may be only half the decrease recorded last year.

### Electronic air cleaners

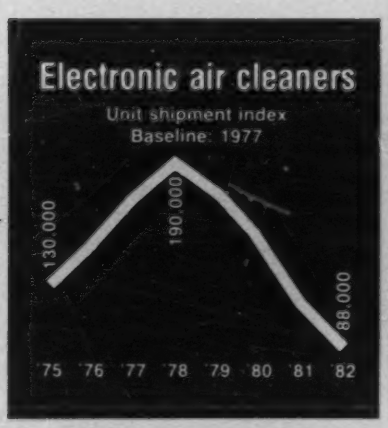
Total shipments of electronic air cleaners (eac's) dropped by 25.4% last year to 88,000 units from a revised 1981 total of 118,000 units. Last year's drop was almost identical to that taken in the previous year.

Like humidifiers, the twin impacts of pressure on disposable income and the depressed housing market combined to severely damage the market for this comfort system accessory.

The electronic air cleaner has a special compatibility with heat pumps because of its ability to keep the indoor coil clean in winter when it runs under dry conditions.

Industry observers note, however, that the rapidly growing number of furnace and air conditioner replacements may have brought about a paradox. They feel many homeowners who, a few years ago, would have purchased an electronic air cleaner now are electing to spend the extra money on increased efficiency.

This year should provide an indicator. With the economy and interest rates improving and a substantial increase in housing starts a strong probability, it would appear reasonable to expect at least a 20% improvement in electronic air cleaner shipments.

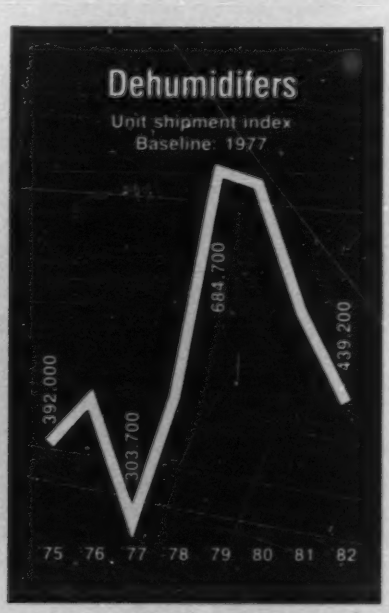


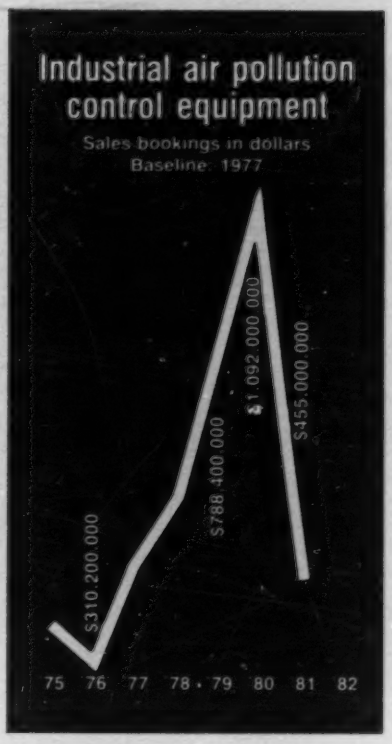

### Dehumidifiers

Shipments of dehumidifiers, which reached their peak in 1979, dropped by 18.1% last year, according to the Association of Home Appliance Manufacturers (AHAM).

Manufacturers shipped 439,200 units in 1982, down from 536,100 units during the previous year, which also represented a 20% drop from 1980 levels. AHAM expects an 8.5% increase in 1983 shipments to 477,000 units.

It might be noted that, in its last report, the Bureau of the Census reported that 394,615 dehumidifiers were shipped in 1981, down 7% from the 423,986 units shipped in 1980.




### Automatic vent dampers

Shipments of automatic vent dampers declined about 5% in 1982 to a total of approximately 385,000 units. Of these, the vast majority (about 80%) were thermally actuated; the rest were electrically or mechanically actuated models.

About 90% of all vent dampers are sold in the aftermarket, with the balance being used as an original equipment component.

A relatively mild winter has dampened the enthusiasm for this energy-saving component, as well as the emergence of new high efficiency furnaces and boilers whose configuration does not include vent dampers.

The most optimistic prognosis for vent dampers would be that they will remain at their present volume, with a gradual decline throughout the decade as primary market areas reach their saturation point.

*50-state summary*

# Home central cooling grew 225% during turbulent 1970's

*by Thomas A. Mahoney*

Data just now emerging from the 1980 census reflects the impressive growth of air conditioning in American homes.

We present in this section provisional estimates on housing characteristics for the 50 states and the District of Columbia. Final data will be issued later in 1983 by the Bureau of Census.

The census shows that fully 55% of American homes, as of 1980, had some form of air conditioning. A particularly vigorous growth came in the central air conditioning sector, which grew by 225%. This growth occurred during the turbulent 1970's, a decade that saw two separate "energy shocks" neither of which permanently halted the 25-year growth of central cooling.

Central cooling is now found in 28% of American homes, compared with 18% saturation a decade ago. The number of states in which central systems exceed room units in homes is now 20.

For the first time, the Bureau of Census counted electric heat pumps, which now total more than 3 million. This does not include add-on heat pumps which supplement other types of heating systems.

Home heating fuels have undergone a significant shift. The decline in fuel oil from a 26% saturation to 18% was caused by extraneous economic developments that have nothing to do with that fuel's intrinsic value. Nevertheless, states like Maine, New Hampshire, and Vermont have embraced wood as a home heating fuel, either as the primary source or as a secondary one.

Electricity to heat homes jumped from an 8% saturation to 18%, reflecting the bulge of new homes built in the south and the growing prominence of the electric heat pump. The use of natural gas remained virtually unchanged during the decade, despite severe distribution problems that have since been corrected.

Certain states contain very large numbers of centrally cooled homes. For instance, Texas has 2.9 million such homes; Florida, 2.4 million; California, 2 million; and Illinois, 1.3 million.

The saturation of central cooling shows Arizona with 63%; Florida with 57%; Nevada with 56%; and Texas with 53%.

The housing inventory presented here represents a huge replacement market, as indicated by the number of states whose older homes contain home heating plants that will have to replaced.

Fuel saturation is very significant. Assuming that the deregulation of natural gas is accomplished, the expected run-up of costs will make the add-on elec-

tric heat pump an even more attractive supplementary home heating device.

Likewise, that vast stretch of American homes heated with ducted warm air from gas furnaces enhances the prospects for the new generation of high-efficiency gas furnaces. As with home heating oil in the late 1970's, natural gas prices are now a subject of intense national controversy — headlined in the daily newspapers and trumpeted in the network news programs. The hvac contractor has an enormous potential to re-emerge as the expert when the worried homeowner is forced to make a capital outlay for a new home heating system.

A word about sources.

Most of the data is taken from the Provisional Estimates of Social, Economic, and Housing Characteristics, published by the Bureau of the Census.

The average unitary shipments to the states are four-year averages from reports of the Air-Conditioning and Refrigeration Institute (ARI). The metro area housing forecast for selected markets (and for some entire states) is taken from the forecast of the National Association of Home Builders (NAHB).

We believe the numbers presented here will give marketers a starting point for a more thorough analysis of the market for home heating-cooling systems.

# Alabama

**All-year housing units**
**1,449,441**

**Average unitary air conditioner shipments, including heat pumps: 56,800**

**Type of homes**

| | |
|---|---|
| Single-family homes | 76% |
| Multifamily homes | 16% |
| Mobile homes | 8% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 2% |
| Warm air furnace | 40% |
| Heat pump | 7% |
| Built-in electric | 7% |
| Floor, wall, pipeless furnace | 8% |
| Room heater | 24% |
| Fireplace, stove | 12% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 4% |
| 4 to 7 years | 11% |
| 8 to 12 years | 15% |
| 13 to 20 years | 23% |
| 21 to 30 years | 18% |
| 31 to 40 years | 12% |
| 41 years or more | 17% |

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 37% |
| With one or more room units | 34% |
| No air conditioning | 29% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 48% |
| Bottled, tank, LP gas | 16% |
| Electricity | 26% |
| Fuel oil/kerosene | 1% |
| Coal/coke | 1% |
| Wood | 7% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Birmingham | 1981 | 1,319 | 814 | 2,133 |
| | 1982 | 895 | 202 | 1,097 |
| | 1983 | 1,030 | 450 | 1,480 |

# Alaska

**All-year housing units**
**152,898**

**Type of homes**

| | |
|---|---|
| Single-family homes | 52% |
| Multifamily homes | 37% |
| Mobile homes | 11% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 43% |
| Warm air furnace | 23% |
| Heat pump | 1% |
| Built-in electric | 12% |
| Floor, wall, pipeless furnace | 1% |
| Room heater | 8% |
| Fireplace, stove | 11% |
| None | 1% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 6% |
| 4 to 7 years | 25% |
| 8 to 12 years | 21% |
| 13 to 20 years | 23% |
| 21 to 30 years | 14% |
| 31 to 40 years | 7% |
| 41 years or more | 4% |

**Average unitary air conditioner shipments, including heat pumps: 100**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | —% |
| With one or more room units | —% |
| No air conditioning | 100% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 35% |
| Bottled, tank, LP gas | 1% |
| Electricity | 15% |
| Fuel oil/kerosene | 39% |
| Coal/coke | 2% |
| Wood | 7% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Anchorage | 1981 | 2,100 | 1,005 | 3,105 |
| | 1982 | 3,313 | 3,100 | 6,413 |
| | 1983 | 2,000 | 1,500 | 3,500 |

# Arizona

**All-year housing units**
**1,079,878**

**Type of homes**

| | |
|---|---|
| Single-family homes | 66% |
| Multifamily homes | 22% |
| Mobile homes | 12% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 2% |
| Warm air furnace | 58% |
| Heat pump | 16% |
| Built-in electric | 4% |
| Floor, wall, pipeless furnace | 4% |
| Room heater | 9% |
| Fireplace, stove | 5% |
| None | 2% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 9% |
| 4 to 7 years | 18% |
| 8 to 12 years | 23% |
| 13 to 20 years | 21% |
| 21 to 30 years | 16% |
| 31 to 40 years | 6% |
| 41 years or more | 7% |

**Average unitary air conditioner shipments, including heat pumps: 51,700**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 63% |
| With one or more room units | 8% |
| No air conditioning | 29% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 57% |
| Bottled, tank, LP gas | 4% |
| Electricity | 35% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 3% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Phoenix | 1981 | 10,300 | 9,100 | 19,400 |
| | 1982 | 12,800 | 10,200 | 23,000 |
| | 1983 | 20,000 | 10,000 | 30,000 |
| Tucson | 1981 | 1,900 | 2,900 | 4,800 |
| | 1982 | 2,250 | 4,000 | 6,250 |
| | 1983 | 3,200 | 3,500 | 6,700 |

## Alco 240—extras—without extra cost.

The easy part of the job is the Alco 240 Series universal diaphragm solenoid valve.

Because it's so flexible. So easy to install. And so darned reliable.

Interchangeable coils adapt it up to 480 V AC. It mounts horizontally or vertically and keeps working with less than 1 psi differential. Extended copper tube ends mean you can sweat it in without taking it apart. As much as 40% faster at no extra cost.

In fact, it's so easy to install and so reliable, it's the most successful new product we've ever introduced.

Alco 240. Another Alco innovation to make your job easier. Find out more about it.

ALCO leading the way in flow controls.

ALCO

Alco Controls Division, Emerson Electric Co. [illegible] MO 63141

Circle 2 on Reader Action [illegible]

EMERSON

# Arkansas

**All-year housing units**
**890,143**

**Type of homes**

| | |
|---|---|
| Single-family homes | 78% |
| Multifamily homes | 13% |
| Mobile homes | 9% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 1% |
| Warm air furnace | 43% |
| Heat pump | 3% |
| Built-in electric | 3% |
| Floor, wall, pipeless furnace | 8% |
| Room heater | 27% |
| Fireplace, stove | 13% |
| None | 2% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 4% |
| 4 to 7 years | 13% |
| 8 to 12 years | 17% |
| 13 to 20 years | 22% |
| 21 to 30 years | 15% |
| 31 to 40 years | 12% |
| 41 years or more | 17% |

**Average unitary air conditioner shipments, including heat pumps: 33,900**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 39% |
| With one or more room units | 32% |
| No air conditioning | 29% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 56% |
| Bottled, tank, LP gas | 16% |
| Electricity | 17% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 11% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Little Rock | 1981 | 607 | 734 | 1,341 |
| | 1982 | 474 | 2,086 | 2,560 |
| | 1983 | 738 | 1,049 | 1,787 |

# California

**All-year housing units**
**9,206,826**

**Type of homes**

| | |
|---|---|
| Single-family homes | 63% |
| Multifamily homes | 33% |
| Mobile homes | 4% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 3% |
| Warm air furnace | 47% |
| Heat pump | 2% |
| Built-in electric | 9% |
| Floor, wall, pipeless furnace | 22% |
| Room heater | 13% |
| Fireplace, stove | 3% |
| None | 1% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 4% |
| 4 to 7 years | 10% |
| 8 to 12 years | 13% |
| 13 to 20 years | 24% |
| 21 to 30 years | 22% |
| 31 to 40 years | 13% |
| 41 years or more | 14% |

**Average unitary air conditioner shipments, including heat pumps: 249,700**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 22% |
| With one or more room units | 18% |
| No air conditioning | 60% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 79% |
| Bottled, tank, LP gas | 2% |
| Electricity | 16% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Los Angeles | 1981 | 6,368 | 15,400 | 21,768 |
| | 1982 | 3,800 | 9,300 | 13,100 |
| | 1983 | 4,000 | 10,000 | 14,000 |
| San Francisco | 1981 | 5,900 | 3,900 | 9,800 |
| | 1982 | 4,450 | 4,500 | 8,950 |
| | 1983 | 5,500 | 5,000 | 10,500 |

# Colorado

**All-year housing units**
**1,176,309**

**Average unitary air conditioner shipments, including heat pumps: 16,425**

**Type of homes**

| | |
|---|---|
| Single-family homes | 67% |
| Multifamily homes | 27% |
| Mobile homes | 6% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 17% |
| Warm air furnace | 63% |
| Heat pump | 2% |
| Built-in electric | 6% |
| Floor, wall, pipeless furnace | 3% |
| Room heater | 6% |
| Fireplace, stove | 3% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 6% |
| 4 to 7 years | 13% |
| 8 to 12 years | 19% |
| 13 to 20 years | 20% |
| 21 to 30 years | 16% |
| 31 to 40 years | 7% |
| 41 years or more | 19% |

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 15% |
| With one or more room units | 15% |
| No air conditioning | 70% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 82% |
| Bottled, tank, LP gas | 5% |
| Electricity | 10% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Denver | 1981 | 10,606 | 3,708 | 14,314 |
| | 1982 | 10,573 | 5,021 | 15,594 |
| | 1983 | 11,193 | 4,807 | 16,000 |
| Colorado Springs | 1981 | 2,610 | 440 | 3,050 |
| | 1982 | 3,360 | 640 | 4,000 |
| | 1983 | 4,000 | 800 | 4,800 |

# Connecticut

**All-year housing units**
**1,147,075**

**Average unitary air conditioner shipments, including heat pumps: 10,000**

**Type of homes**

| | |
|---|---|
| Single-family homes | 61% |
| Multifamily homes | 38% |
| Mobile homes | 1% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 52% |
| Warm air furnace | 27% |
| Heat pump | 2% |
| Built-in electric | 9% |
| Floor, wall, pipeless furnace | 1% |
| Room heater | 6% |
| Fireplace, stove | 3% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 2% |
| 4 to 7 years | 6% |
| 8 to 12 years | 11% |
| 13 to 20 years | 18% |
| 21 to 30 years | 18% |
| 31 to 40 years | 12% |
| 41 years or more | 33% |

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 15% |
| With one or more room units | 16% |
| No air conditioning | 69% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 22% |
| Bottled, tank, LP gas | 1% |
| Electricity | 11% |
| Fuel oil/kerosene | 63% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Hartford | 1981 | 1,395 | 640 | 2,035 |
| | 1982 | 1,470 | 510 | 1,980 |
| | 1983 | 1,500 | 750 | 2,250 |
| New Haven | 1981 | 510 | 455 | 965 |
| | 1982 | 580 | 270 | 850 |
| | 1983 | 600 | 450 | 1,050 |

# Delaware

**All-year housing units**
**232,908**

**Type of homes**

| | |
|---|---|
| Single-family homes | 68% |
| Multifamily homes | 24% |
| Mobile homes | 8% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 23% |
| Warm air furnace | 54% |
| Heat pump | 2% |
| Built-in electric | 6% |
| Floor, wall, pipeless furnace | 2% |
| Room heater | 9% |
| Fireplace, stove | 2% |
| None | 2% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 8% |
| 8 to 12 years | 13% |
| 13 to 20 years | 24% |
| 21 to 30 years | 19% |
| 31 to 40 years | 11% |
| 41 years or more | 22% |

**Average unitary air conditioner shipments, including heat pumps: 5,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 30% |
| With one or more room units | 34% |
| No air conditioning | 36% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 27% |
| Bottled, tank, LP gas | 3% |
| Electricity | 12% |
| Fuel oil/kerosene | 56% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Delaware | 1981 | 1,830 | 510 | 2,340 |
| | 1982 | 1,490 | 1,470 | 2,960 |
| | 1983 | 2,140 | 820 | 2,960 |

# District of Columbia

**All-year housing units**
**276,849**

**Type of homes**

| | |
|---|---|
| Single-family homes | 34% |
| Multifamily homes | 66% |
| Mobile homes | —% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 48% |
| Warm air furnace | 34% |
| Heat pump | 2% |
| Built-in electric | 4% |
| Floor, wall, pipeless furnace | 2% |
| Room heater | 8% |
| Fireplace, stove | 1% |
| None | 1% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 1% |
| 4 to 7 years | 1% |
| 8 to 12 years | 1% |
| 13 to 20 years | 15% |
| 21 to 30 years | 21% |
| 31 to 40 years | 21% |
| 41 years or more | 40% |

**Average unitary air conditioner shipments, including heat pumps: ***

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 31% |
| With one or more room units | 32% |
| No air conditioning | 37% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 60% |
| Bottled, tank, LP gas | 1% |
| Electricity | 9% |
| Fuel oil/kerosene | 29% |
| Coal/coke | —% |
| Wood | —% |
| Other/none | 1% |

*Shipments split between Maryland and Virgina

# HENRY VALVE is a cool hit in any league

Cooling fans in domed stadiums or fans enjoying a cool one makes little difference, Henry Valve is dedicated to keep cooling systems performing, spectators happy.

Our team of professionals continually strive to improve our line of ammonia and halocarbon valves and accessories. Our three plants and seven warehouses give you the bench strength you want and need. Your cooling systems will be a big hit with Henry Valve and AC&R Components Inc. products. Don't get shut out, buy and use our products.

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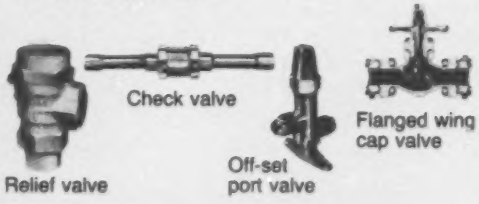
We are the only manufacturer with both ammonia and halocarbon valve and accessory line. For almost 70 years, our products have been cooling people and products.




**7 warehouses offer speedy service.**

Our expanded facilities allow us to deliver products whenever you need them. Your customers can't afford downtime, neither can you.

Catalog 206
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Catalog 109
Halocarbon valves and accessories.

Catalog 9
Compressor Protective Devices

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8377

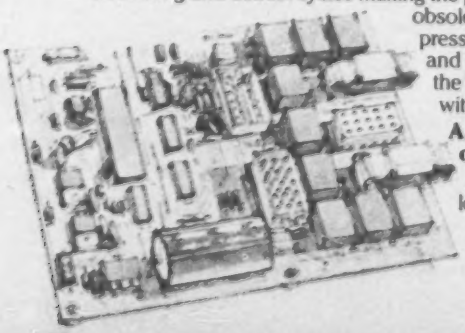
# The word is out. Our new microprocessor heat pump is in.

It starts when one of the neighbors buys one. Then the word spreads. There's a new heat pump available that's actually controlled by a microprocessor. It's our popular new Thinking Heat Pump. So smart. And so easy to sell.

**A heat pump that thinks for itself.**

Meet the deluxe heat pump with a brain. A heat pump so advanced, it can be programmed to operate according to the local climate and energy costs. You see, the Thinking Heat Pump has a microprocessor built right into the control. Only Bryant makes authentic microprocessor technology available to your customers at a price they can afford.

The microprocessor makes the Thinking Heat Pump function reliably and with split-second timing. It plans for warm air start-ups on heating and defrost cycles making the problem of "cold blow" obsolete. It even detects compressor failure, short circuits, and brownouts and protects the Thinking Heat Pump with full shut-off.

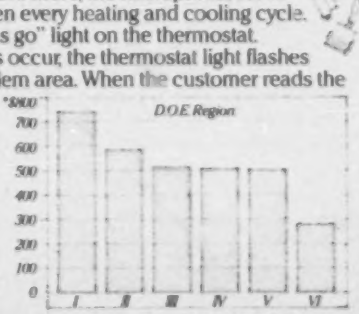


**A heat pump that takes care of itself.**

The microprocessor looks after the Thinking

Heat Pump in a lot of ways. For example, even after 3 complete checks and a 100 hour factory burn-in, it runs the Thinking Heat Pump through all the cycles one more time. What's more, the microprocessor re-checks all systems between every heating and cooling cycle. And flashes an "all systems go" light on the thermostat.

If a problem ever does occur, the thermostat light flashes a code to indicate the problem area. When the customer reads the code to you over the phone, you can come prepared for the call. And to make servicing even easier, we make a field analyzer. Just plug it in and it makes a thorough check of the microprocessor within seconds.




*Estimated operating cost savings (1983-1986), Bryant deluxe heat pump model 545B vs. Bryant standard model 541.

**A heat pump that helps pay for itself.**

The thinking we put into this new heat pump really pays off in terms of efficiency. It has a rating of up to 10.0 SEER for cooling. That's about 1/3 higher than ordinary heat pumps. And in the heating cycle, it has a COP of up to 3.0. To save money year 'round as an addition to any electric, gas, or oil heating system.

To get such high efficiency, we put 30 to 50% more coil area into the Thinking Heat Pump than in ordinary heat pumps. And we developed a new, patented defrost system. Unlike ordinary heat pumps that waste energy by defrosting at 90 minute intervals whether they need it or not, the microprocessor has the ability to sense frost conditions. And activates the defrost cycle only when necessary.

Our immersion heater also functions on demand. And takes advantage of the heat from the compressor by staying off 5 minutes for every 1 minute the compressor runs.

**A heat pump that practically sells itself.**

Your customers will find the Thinking Heat Pump is so advanced, so efficient, and so reasonably priced (only about $400 more than ordinary heat pumps), it's bound to become a household word.

To make sure you're the one who starts people talking, call your Bryant distributor today. You'll receive an in-home selling manual plus details about our informative training session. Both designed to make the Thinking Heat Pump the most profitable heat pump for you and the most popular heat pump in your neighborhood.

## It really does pay to be a Bryant Dealer.

bryant

Circle 10 on Reader Action Card

# Florida

**All-year housing units**
**4,282,945**

**Type of homes**

| | |
|---|---|
| Single-family homes | 59% |
| Multifamily homes | 32% |
| Mobile homes | 9% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 2% |
| Warm air furnace | 41% |
| Heat pump | 15% |
| Built-in electric | 16% |
| Floor, wall, pipeless furnace | 4% |
| Room heater | 14% |
| Fireplace, stove | 6% |
| None | 2% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 6% |
| 4 to 7 years | 14% |
| 8 to 12 years | 23% |
| 13 to 20 years | 25% |
| 21 to 30 years | 18% |
| 31 to 40 years | 7% |
| 41 years or more | 7% |

**Average unitary air conditioner shipments, including heat pumps: 250,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 57% |
| With one or more room units | 28% |
| No air conditioning | 15% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 12% |
| Bottled, tank, LP gas | 12% |
| Electricity | 61% |
| Fuel oil/kerosene | 11% |
| Coal/coke | —% |
| Wood | 1% |
| Other/none | 3% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Miami | 1981 | 4,751 | 11,055 | 15,806 |
| | 1982 | 1,791 | 5,842 | 7,633 |
| | 1983 | 3,050 | 9,100 | 12,150 |
| Tampa | 1981 | 6,990 | 10,560 | 17,550 |
| | 1982 | 6,870 | 6,790 | 13,660 |
| | 1983 | 9,700 | 8,500 | 18,200 |

# Georgia

**All-year housing units**
**2,013,595**

**Type of homes**

| | |
|---|---|
| Single-family homes | 71% |
| Multifamily homes | 21% |
| Mobile homes | 8% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 2% |
| Warm air furnace | 51% |
| Heat pump | 4% |
| Built-in electric | 5% |
| Floor, wall, pipeless furnace | 7% |
| Room heater | 23% |
| Fireplace, stove | 7% |
| None | 1% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 10% |
| 8 to 12 years | 19% |
| 13 to 20 years | 24% |
| 21 to 30 years | 16% |
| 31 to 40 years | 10% |
| 41 years or more | 18% |

**Average unitary air conditioner shipments, including heat pumps: 86,700**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 39% |
| With one or more room units | 27% |
| No air conditioning | 34% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 55% |
| Bottled, tank, LP gas | 18% |
| Electricity | 19% |
| Fuel oil/kerosene | 2% |
| Coal/coke | —% |
| Wood | 5% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Atlanta | 1981 | 12,820 | 5,660 | 18,480 |
| | 1982 | 17,135 | 6,435 | 23,570 |
| | 1983 | 18,600 | 6,585 | 25,185 |

# "...and best of all, it's a Whirlpool!"

If your customer is looking for high efficiency ratings, top discharge designs, safety and performance features and economical price, Whirlpool air conditioners give you plenty to talk about. But there is *one* feature no other brand has...the Whirlpool name. The name that's known by the American consumer as one they can trust for quality, dependability and value. Which is why the clincher to your sales story is, "and best of all, it's a Whirlpool!"

**Doesn't it make sense to sell them what they want?**

**Whirlpool**
HEATING & COOLING PRODUCTS

Circle 69 on Reader Action Card

# Hawaii

**All-year housing units**
**333,568**

**Type of homes**

| | |
|---|---|
| Single-family homes | 50% |
| Multifamily homes | 50% |
| Mobile homes | —% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 5% |
| Warm air furnace | —% |
| Heat pump | 1% |
| Built-in electric | 2% |
| Floor, wall, pipeless furnace | —% |
| Room heater | —% |
| Fireplace, stove | 2% |
| None | 90% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 5% |
| 4 to 7 years | 12% |
| 8 to 12 years | 21% |
| 13 to 20 years | 28% |
| 21 to 30 years | 15% |
| 31 to 40 years | 8% |
| 41 years or more | 11% |

**Average unitary air conditioner shipments, including heat pumps: 1,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 5% |
| With one or more room units | 11% |
| No air conditioning | 84% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 4% |
| Bottled, tank, LP gas | 1% |
| Electricity | 4% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 1% |
| Other/none | 90% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Hawaii | 1981 | 2,590 | 3,940 | 6,530 |
| | 1982 | 1,940 | 2,500 | 4,440 |
| | 1983 | 2,500 | 4,720 | 7,220 |

# Idaho

**All-year housing units**
**356,432**

**Type of homes**

| | |
|---|---|
| Single-family homes | 72% |
| Multifamily homes | 18% |
| Mobile homes | 10% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 2% |
| Warm air furnace | 44% |
| Heat pump | 5% |
| Built-in electric | 22% |
| Floor, wall, pipeless furnace | 3% |
| Room heater | 10% |
| Fireplace, stove | 12% |
| None | 2% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 5% |
| 4 to 7 years | 17% |
| 8 to 12 years | 14% |
| 13 to 20 years | 15% |
| 21 to 30 years | 14% |
| 31 to 40 years | 12% |
| 41 years or more | 23% |

**Average unitary air conditioner shipments, including heat pumps: 5,300**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 16% |
| With one or more room units | 16% |
| No air conditioning | 68% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 27% |
| Bottled, tank, LP gas | 4% |
| Electricity | 39% |
| Fuel oil/kerosene | 17% |
| Coal/coke | 2% |
| Wood | 10% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Boise | 1981 | 460 | 100 | 560 |
| | 1982 | 360 | 80 | 440 |
| | 1983 | 460 | 100 | 560 |

## The goal: higher ice machine profits. The winning combination: you and Scotsman.

Scotsman ... the hottest line in the league, can give you a perfect season every season. Here's what you've got on your side.

- **Team Recognition** ... more people use Scotsman than any other machine.
- **Largest Team on Ice** ... over 100 models ... every ice user is a prospect.
- **Reasonable Admission** ... the world's most reliable ice machines sell at a price that meets or beats competition.
- **Strongest Defense** ... 60 days factory labor, 2 years parts and 5 years compressor warranty, plus guaranteed parts availability.* After-sale includes field service representatives, toll-free number direct to factory specialists.

*Functional parts for current models shipped within 72 hours.

- **Highest-Scoring Offense** ... prospects are presold with factory sponsored national advertising, direct mail, yellow pages, public relations, Dodge reports and Sweets programs.
- **Best Farm System** ... our research and development laboratories back up dealers with new products ... more opportunities to make money.
- **All-Star Quality** ... our rigid quality controls mean Scotsman machines work right ... right from the start.

Join the winners. For more information, call Richard Denman, Vice President of Marketing, at (507) 373-3961. Or mail the coupon for a free Scotsman Dealer Opportunities Kit. You'll be under no obligation.

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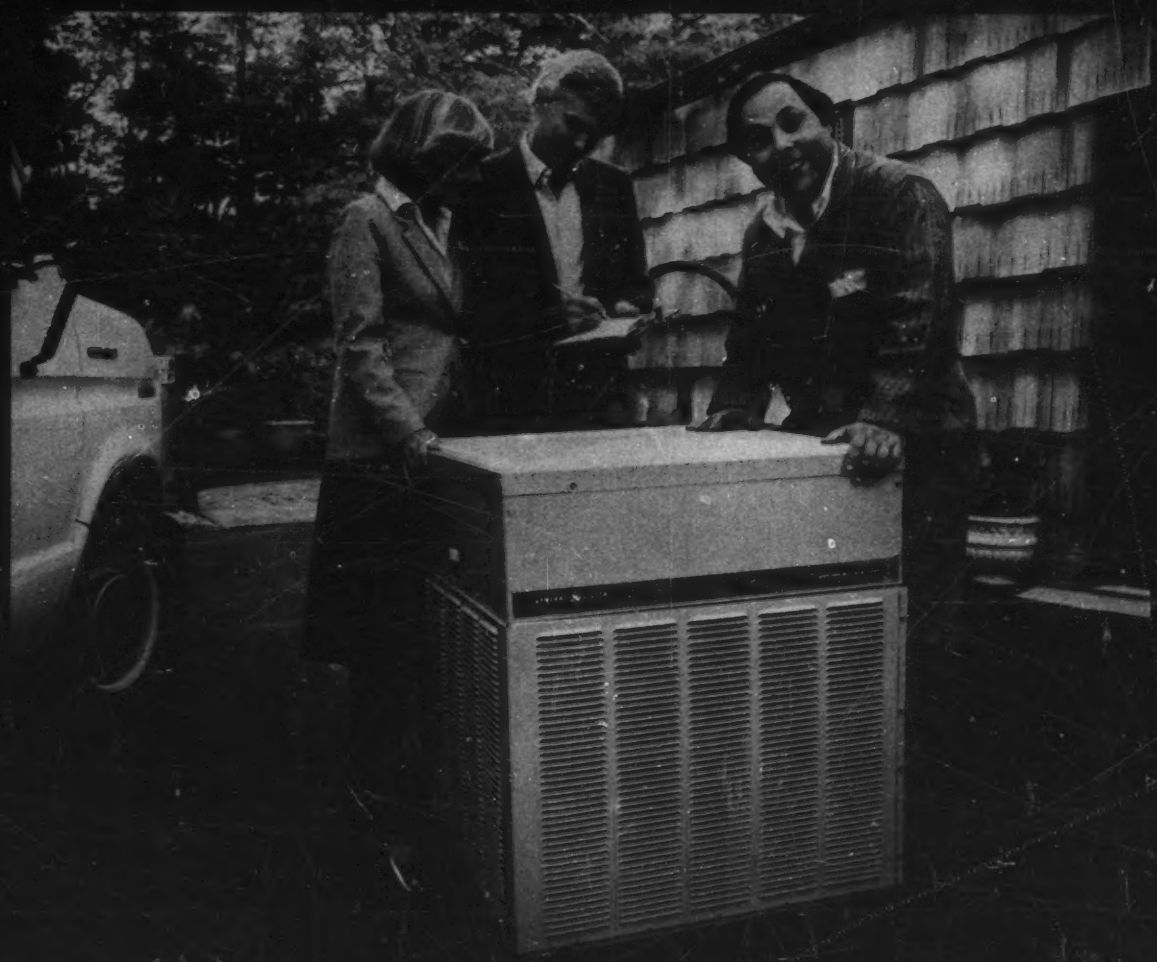
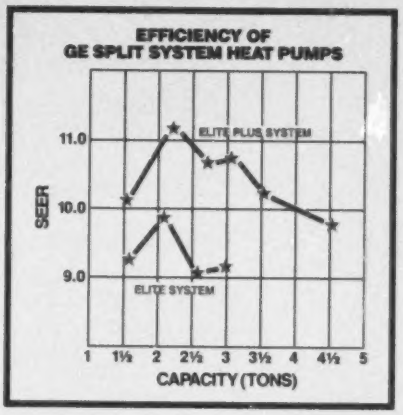
Circle 53 on Reader Action Card

# INTRODUCING THE NEW GE HEAT PUMP AND COOLING SYSTEMS DESIGNED WITH EVERYBODY'S COMFORT IN MIND. ESPECIALLY YOURS.



## THE NEW GE 10 SEER HEAT PUMP LINE GIVES YOUR CUSTOMERS THE KIND OF EFFICIENCY THEY WANT AND NEED TODAY.

The new GE Elite Plus Heat Pump line is one of the most efficient lines in the industry today. And it's available today. That means you can offer your customers energy savings and a shorter payback on their initial investment. Right now, when they need it.




GE Heat Pump systems are available in a broad range of sizes to fit any need. From 1½ to 4½ tons, with SEER ratings of up to 11.2 and COPs up to 3.3. So no matter what your customers need, you'll be able to offer them a GE Heat Pump system that represents the industry standard for value and performance.

Whichever General Electric Heat Pump system they choose, or cooling system, you'll be able to give them high efficiency, the opportunity for fast payback and continued energy savings. No one else can offer them more.

## THE GE PRODUCT LINE IS FLEXIBLE, SO WHEN IT COMES TO SALES, YOU CAN BE TOO.

Now you can be more flexible by tailoring bids with sell-up options for the specific needs of your heat pump or cooling jobs because you can offer your customers four different efficiency levels. And GE systems' flexibility also means you'll have fewer units to stock.

Your customers will find these GE systems attractive, since they're designed to take advantage of local utility incentive programs.

And you'll find these GE systems attractive, because they'll help you capitalize on the fastest-growing segments of the industry—cooling replacement and heat pump sales.

## QUALITY, PERFORMANCE AND SUPPORT WILL HELP YOU SELL GE PRODUCTS.

GE improvements symbolize our dedication to quality. Quality you can count on. For instance, our Climatuff™ Compressor is recognized as one of the best in the industry. Spine Fin™ Coil, originally developed by GE, is one of the most efficient heat-transfer systems in the business today. And we're now backing it with a 5-year limited warranty on Elite and Executive models.

But we don't stop there. Now we've developed a new Easy Access Service Panel that makes the switch-over valve, expansion valve, driers and check valves more accessible—so servicing is easier.

And we deliver more than just quality products. We also provide sales support. For instance, our new Portable In-Home Mini-Computer Terminal will help you provide your customers, right in their own homes, with the proof on how much they can save on heating and cooling costs with added insulation, storm windows or high-efficiency GE products.

There's much more to tell you about the new GE Heat Pump and cooling systems' performance, quality, and reliability. So get in touch with us. Call or write Hans Rueschmann, Mgr. Dist. Sales, Trane CAC, Inc. Troup Highway, Tyler, Texas 75711. (214) 581-3569.

**Circle 65 on Reader Action Card**

GE is a registered trademark of the General Electric Company

# Illinois

**All-year housing units**
**4,298,107**

**Type of homes**

| | |
|---|---|
| Single-family homes | 60% |
| Multifamily homes | 37% |
| Mobile homes | 3% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 24% |
| Warm air furnace | 61% |
| Heat pump | 1% |
| Built-in electric | 4% |
| Floor, wall, pipeless furnace | 2% |
| Room heater | 7% |
| Fireplace, stove | 1% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 2% |
| 4 to 7 years | 7% |
| 8 to 12 years | 9% |
| 13 to 20 years | 17% |
| 21 to 30 years | 18% |
| 31 to 40 years | 12% |
| 41 years or more | 35% |

**Average unitary air conditioner shipments, including heat pumps: 107,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 31% |
| With one or more room units | 36% |
| No air conditioning | 33% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 82% |
| Bottled, tank, LP gas | 5% |
| Electricity | 7% |
| Fuel oil/kerosene | 5% |
| Coal/coke | —% |
| Wood | —% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Chicago | 1981 | 4,815 | 7,350 | 12,165 |
| | 1982 | 4,425 | 5,425 | 9,850 |
| | 1983 | 5,000 | 6,500 | 11,500 |
| Peoria | 1981 | 365 | 290 | 655 |
| | 1982 | 190 | 310 | 500 |
| | 1983 | 290 | 340 | 630 |

# Indiana

**All-year housing units**
**2,059,024**

**Type of homes**

| | |
|---|---|
| Single-family homes | 75% |
| Multifamily homes | 20% |
| Mobile homes | 5% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 8% |
| Warm air furnace | 65% |
| Heat pump | 3% |
| Built-in electric | 10% |
| Floor, wall, pipeless furnace | 3% |
| Room heater | 8% |
| Fireplace, stove | 3% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 2% |
| 4 to 7 years | 8% |
| 8 to 12 years | 12% |
| 13 to 20 years | 19% |
| 21 to 30 years | 16% |
| 31 to 40 years | 11% |
| 41 years or more | 32% |

**Average unitary air conditioner shipments, including heat pumps: 47,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 29% |
| With one or more room units | 29% |
| No air conditioning | 42% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 61% |
| Bottled, tank, LP gas | 7% |
| Electricity | 17% |
| Fuel oil/kerosene | 12% |
| Coal/coke | —% |
| Wood | 3% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Evansville | 1981 | 396 | 343 | 739 |
| | 1982 | 314 | 340 | 654 |
| | 1983 | 480 | 450 | 930 |
| Indianapolis | 1981 | 1,563 | 2,781 | 4,344 |
| | 1982 | 1,424 | 2,910 | 4,334 |
| | 1983 | 2,000 | 2,700 | 4,700 |

# YEARS IN A ROW

# RUUD® GAINS MARKET SHARE

For the fifth year in a row, Ruud has gained market share. Ruud's market share at the end of 1982 is more than 20 percent higher than it was in 1981. Such strong growth in the face of the worst recession since World War II means Ruud is doing what it takes to achieve continued success, year after year. Find out how you can put Ruud's success to work for you.

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A DIVISION OF CITY INVESTING CO.
P. O. BOX 6444 FORT SMITH, ARKANSAS 72906

501-646-4311

# Iowa

**All-year housing units**
**1,128,000**

**Average unitary air conditioner shipments, including heat pumps: 30,000**

| Type of homes | |
|---|---|
| Single-family homes | 77% |
| Multifamily homes | 20% |
| Mobile homes | 3% |

| Home heating equipment saturation | |
|---|---|
| Hydronic | 10% |
| Warm air furnace | 72% |
| Heat pump | 2% |
| Built-in electric | 5% |
| Floor, wall, pipeless furnace | 3% |
| Room heater | 6% |
| Fireplace, stove | 1% |
| None | 1% |

| Age of homes | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 10% |
| 8 to 12 years | 9% |
| 13 to 20 years | 14% |
| 21 to 30 years | 12% |
| 31 to 40 years | 9% |
| 41 years or more | 43% |

| Air conditioning saturation | |
|---|---|
| With central air conditioning | 34% |
| With one or more room units | 33% |
| No air conditioning | 33% |

| Home heating fuel | |
|---|---|
| Natural gas | 67% |
| Bottled, tank, LP gas | 13% |
| Electricity | 9% |
| Fuel oil/kerosene | 10% |
| Coal/coke | —% |
| Wood | 1% |
| Other/none | —% |

# Kansas

**All-year housing units**
**951,054**

**Average unitary air conditioner shipments, including heat pumps: 22,000**

| Type of homes | |
|---|---|
| Single-family homes | 78% |
| Multifamily homes | 16% |
| Mobile homes | 6% |

| Home heating equipment saturation | |
|---|---|
| Hydronic | 3% |
| Warm air furnace | 65% |
| Heat pump | 1% |
| Built-in electric | 2% |
| Floor, wall, pipeless furnace | 14% |
| Room heater | 11% |
| Fireplace, stove | 4% |
| None | —% |

| Age of homes | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 9% |
| 8 to 12 years | 9% |
| 13 to 20 years | 15% |
| 21 to 30 years | 18% |
| 31 to 40 years | 11% |
| 41 years or more | 35% |

| Air conditioning saturation | |
|---|---|
| With central air conditioning | 43% |
| With one or more room units | 32% |
| No air conditioning | 25% |

| Home heating fuel | |
|---|---|
| Natural gas | 81% |
| Bottled, tank, LP gas | 8% |
| Electricity | 8% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 3% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Wichita | 1981 | 2,139 | 981 | 3,120 |
| | 1982 | 1,498 | 1,455 | 2,953 |
| | 1983 | 1,674 | 1,353 | 3,027 |

# Kentucky

**All-year housing units**
**1,353,656**

**Type of homes**

| | |
|---|---|
| Single-family homes | 74% |
| Multifamily homes | 17% |
| Mobile homes | 9% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 3% |
| Warm air furnace | 48% |
| Heat pump | 5% |
| Built-in electric | 10% |
| Floor, wall, pipeless furnace | 7% |
| Room heater | 12% |
| Fireplace, stove | 14% |
| None | 1% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 11% |
| 8 to 12 years | 14% |
| 13 to 20 years | 20% |
| 21 to 30 years | 18% |
| 31 to 40 years | 11% |
| 41 years or more | 23% |

**Average unitary air conditioner shipments, including heat pumps: 35,500**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 29% |
| With one or more room units | 33% |
| No air conditioning | 38% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 48% |
| Bottled, tank, LP gas | 7% |
| Electricity | 23% |
| Fuel oil/kerosene | 6% |
| Coal/coke | 6% |
| Wood | 6% |
| Other/none | 4% |

# Louisiana

**All-year housing units**
**1,530,949**

**Type of homes**

| | |
|---|---|
| Single-family homes | 71% |
| Multifamily homes | 22% |
| Mobile homes | 7% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 2% |
| Warm air furnace | 51% |
| Heat pump | 2% |
| Built-in electric | 4% |
| Floor, wall, pipeless furnace | 8% |
| Room heater | 28% |
| Fireplace, stove | 5% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 4% |
| 4 to 7 years | 12% |
| 8 to 12 years | 14% |
| 13 to 20 years | 23% |
| 21 to 30 years | 18% |
| 31 to 40 years | 13% |
| 41 years or more | 16% |

**Average unitary air conditioner shipments, including heat pumps: 80,700**

**Air conditioning saturation**

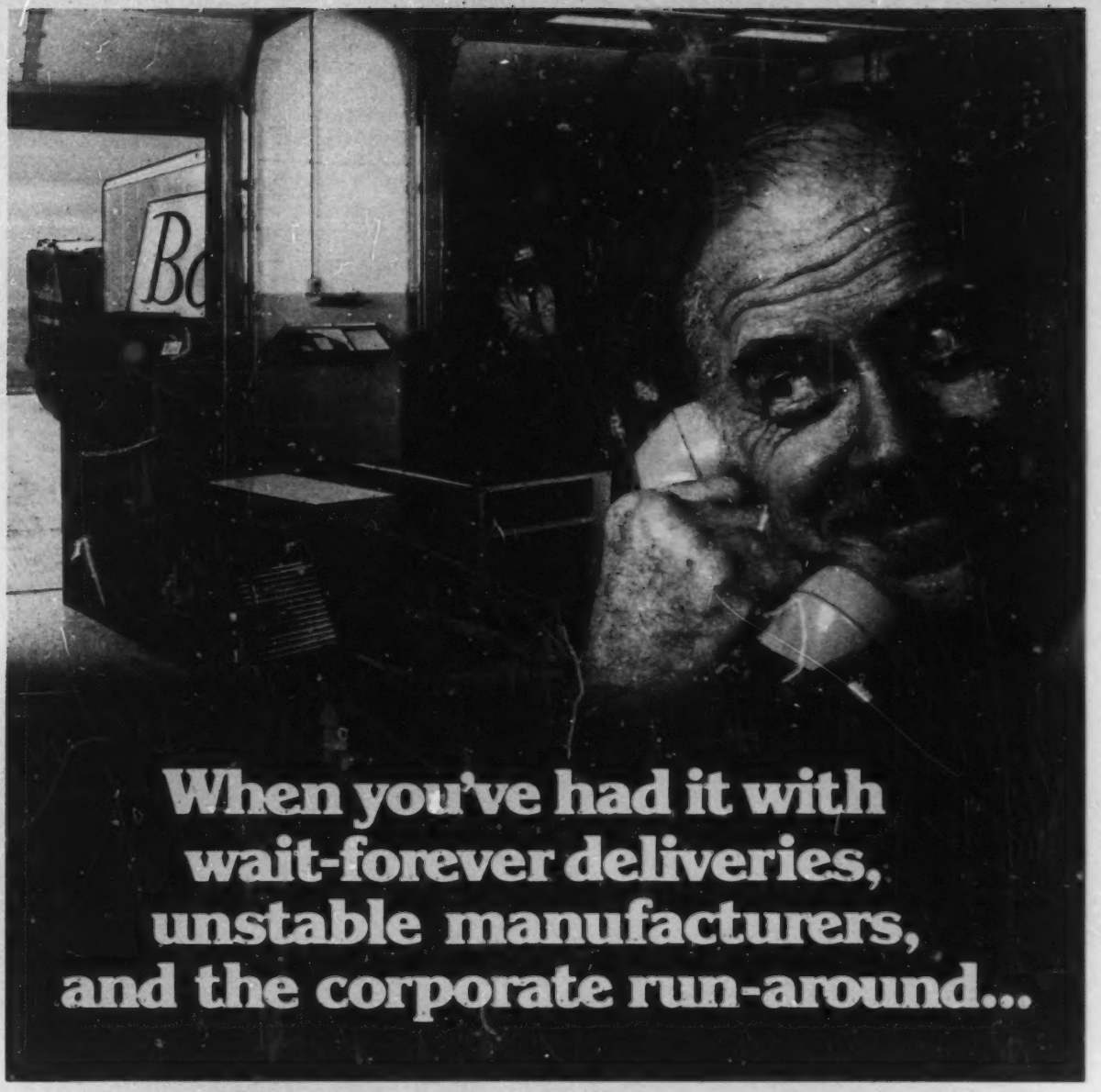
| | |
|---|---|
| With central air conditioning | 46% |
| With one or more room units | 36% |
| No air conditioning | 18% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 69% |
| Bottled, tank, LP gas | 7% |
| Electricity | 22% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| New Orleans | 1981 | 2,926 | 2,604 | 5,530 |
| | 1982 | 3,321 | 2,450 | 5,771 |
| | 1983 | 4,650 | 3,000 | 7,650 |



# When you've had it with wait-forever deliveries, unstable manufacturers, and the corporate run-around...

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Bard

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# Maine

**All-year housing units**
**429,341**

**Type of homes**

| | |
|---|---|
| Single-family homes | 66% |
| Multifamily homes | 27% |
| Mobile homes | 7% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 39% |
| Warm air furnace | 29% |
| Heat pump | 1% |
| Built-in electric | 9% |
| Floor, wall, pipeless furnace | 1% |
| Room heater | 4% |
| Fireplace, stove | 17% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 9% |
| 8 to 12 years | 11% |
| 13 to 20 years | 11% |
| 21 to 30 years | 10% |
| 31 to 40 years | 9% |
| 41 years or more | 47% |

**Average unitary air conditioner shipments, including heat pumps: 800**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 1% |
| With one or more room units | 10% |
| No air conditioning | 89% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 2% |
| Bottled, tank, LP gas | 1% |
| Electricity | 10% |
| Fuel oil/kerosene | 71% |
| Coal/coke | 1% |
| Wood | 15% |
| Other/none | —% |

# Maryland

**All-year housing units**
**1,550,538**

**Type of homes**

| | |
|---|---|
| Single-family homes | 69% |
| Multifamily homes | 29% |
| Mobile homes | 2% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 25% |
| Warm air furnace | 54% |
| Heat pump | 5% |
| Built-in electric | 5% |
| Floor, wall, pipeless furnace | 2% |
| Room heater | 6% |
| Fireplace, stove | 3% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 8% |
| 8 to 12 years | 13% |
| 13 to 20 years | 21% |
| 21 to 30 years | 18% |
| 31 to 40 years | 11% |
| 41 years or more | 26% |

**Average unitary air conditioner shipments, including heat pumps: 25,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 43% |
| With one or more room units | 27% |
| No air conditioning | 30% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 47% |
| Bottled, tank, LP gas | 1% |
| Electricity | 13% |
| Fuel oil/kerosene | 36% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Baltimore | 1981 | 5,370 | 1,150 | 6,520 |
| | 1982 | 5,570 | 1,970 | 7,540 |
| | 1983 | 7,020 | 2,290 | 9,310 |

# ARCO Rediscovers Pumps.

Not gas pumps.

That's the sole domain of our parent firm, The Atlantic Richfield Company.

The new name in the ARCO family is ARCO Comfort Products Co., and our discovery in pumps is a find that you may have found long ago: TwinTemp™ II Split System Heat Pumps from our ARCOAIRE™ Central Heating and Cooling line of products (formerly Friedrich).

Our newest dealers and distributors are discovering what the HVAC industry has known for years. For the designed-in ease of installation, reliability and superior SEER's* and HSPF's* America is seeking, ARCOAIRE RYB Split System Heat Pumps are the choice of those who would rather buy performance than energy.

Featuring solid state technology, the TwinTemp™ Split System Heat Pumps offer SEER's of up to 8.5 and HSPF's as high as 6.9.

Make the most of ARCO's latest energy discovery. Quality ARCOAIRE Central Heating and Cooling products, now available with the deep inventory, prompt order fulfillment and the sales, service and marketing professionalism of ARCO Comfort Products Co.—setting the standards in our industry.

For more information, please contact the Sales and Marketing Department of ARCO Comfort Products Co.

**Seasonal Energy Efficiency Ratio and Heating Seasonal Performance Factor. Based on U.S. Government Standard Tests.*

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THE AIR LINE
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# Massachusetts

**All-year housing units**
**2,136,870**

**Type of homes**

| | |
|---|---|
| Single-family homes | 52% |
| Multifamily homes | 47% |
| Mobile homes | 1% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 55% |
| Warm air furnace | 25% |
| Heat pump | 1% |
| Built-in electric | 8% |
| Floor, wall, pipeless furnace | 1% |
| Room heater | 7% |
| Fireplace, stove | 3% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 1% |
| 4 to 7 years | 4% |
| 8 to 12 years | 9% |
| 13 to 20 years | 14% |
| 21 to 30 years | 14% |
| 31 to 40 years | 10% |
| 41 years or more | 48% |

**Average unitary air conditioner shipments, including heat pumps: 12,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 5% |
| With one or more room units | 32% |
| No air conditioning | 63% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 32% |
| Bottled, tank, LP gas | 1% |
| Electricity | 10% |
| Fuel oil/kerosene | 55% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-fam'ly | Total |
|---|---|---|---|---|
| Boston | 1981 | 3,803 | 3,840 | 7,643 |
| | 1982 | 3,195 | 4,166 | 7,361 |
| | 1983 | 3,546 | 5,110 | 8,656 |

# Michigan

**All-year housing units**
**3,457,022**

**Type of homes**

| | |
|---|---|
| Single-family homes | 74% |
| Multifamily homes | 22% |
| Mobile homes | 4% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 15% |
| Warm air furnace | 71% |
| Heat pump | 1% |
| Built-in electric | 3% |
| Floor, wall, pipeless furnace | 2% |
| Room heater | 6% |
| Fireplace, stove | 2% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 2% |
| 4 to 7 years | 8% |
| 8 to 12 years | 11% |
| 13 to 20 years | 18% |
| 21 to 30 years | 19% |
| 31 to 40 years | 14% |
| 41 years or more | 28% |

**Average unitary air conditioner shipments, including heat pumps: 38,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 14% |
| With one or more room units | 20% |
| No air conditioning | 66% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 77% |
| Bottled, tank, LP gas | 3% |
| Electricity | 5% |
| Fuel oil/kerosene | 13% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Detroit | 1981 | 2,930 | 2,720 | 5,650 |
| | 1982 | 1,900 | 2,100 | 4,000 |
| | 1983 | 2,500 | 2,000 | 4,500 |
| Grand Rapids | 1981 | 1,040 | 650 | 1,690 |
| | 1982 | 920 | 345 | 1,265 |
| | 1983 | 1,100 | 550 | 1,650 |

# Minnesota

**All-year housing units**
**1,533,725**

**Type of homes**

| | |
|---|---|
| Single-family homes | 70% |
| Multifamily homes | 26% |
| Mobile homes | 4% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 22% |
| Warm air furnace | 60% |
| Heat pump | 1% |
| Built-in electric | 5% |
| Floor, wall, pipeless furnace | 2% |
| Room heater | 7% |
| Fireplace, stove | 3% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 4% |
| 4 to 7 years | 12% |
| 8 to 12 years | 13% |
| 13 to 20 years | 16% |
| 21 to 30 years | 15% |
| 31 to 40 years | 8% |
| 41 years or more | 32% |

**Average unitary air conditioner shipments, including heat pumps: 30,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 19% |
| With one or more room units | 31% |
| No air conditioning | 50% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 59% |
| Bottled, tank, LP gas | 8% |
| Electricity | 8% |
| Fuel oil/kerosene | 22% |
| Coal/coke | —% |
| Wood | 3% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Minneapolis | 1981 | 7,300 | 3,900 | 11,200 |
| | 1982 | 6,900 | 4,100 | 11,000 |
| | 1983 | 7,900 | 4,900 | 12,800 |

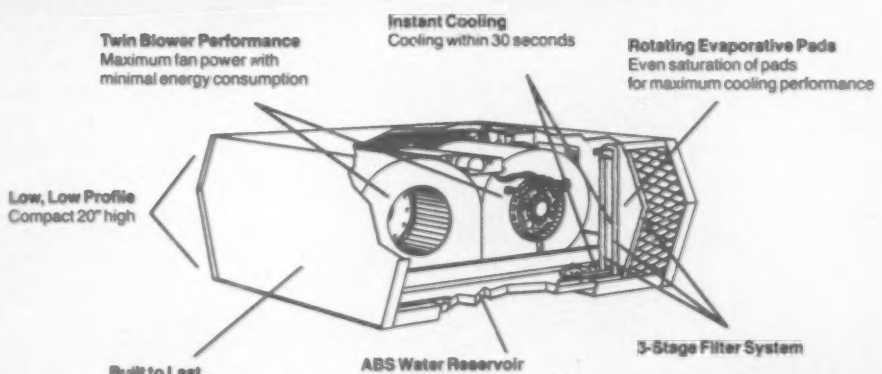

# INTRODUCING FORM AND FUNCTION IN EVAPORATIVE COOLING

**Engineered for Performance and Profit**

BYCOOL gives evaporative cooling a new point of view. Innovative design puts BYCOOL in a class by itself. Compared to outmoded, bulky coolers, there is no comparison.

Our unique triple-filter system means improved filtration, increased ventilation, and maximum cooling. Our new positive bleedoff system controls mineral and alkali build-up. The highest-quality, easy-to-maintain parts result in new reliability and longevity for our entire system.

You can't afford to be without BYCOOL. Low-profile, high-performance, BYCOOL soon will be the evaporative cooler residential and commercial customers demand.


Twin Blower Performance
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Even saturation of pads for maximum cooling performance
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Compact 20" high
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For more informat on on BYCOOL and to get complete details about our attractive dealer package please call Don Parker, Director of Marketing, collect at 602-979-0420 or write
**Byco Ltd., P.O. Box 1405, Greeley, Colorado 80632. (303) 351-6700.**

Circle 11 on Reader Action Card

# Mississippi

**All-year housing units**
**903,861**

**Average unitary air conditioner shipments, including heat pumps: 25,500**

| Type of homes | |
|---|---|
| Single-family homes | 78% |
| Multifamily homes | 14% |
| Mobile homes | 8% |

| Home heating equipment saturation | |
|---|---|
| Hydronic | 1% |
| Warm air furnace | 39% |
| Heat pump | 4% |
| Built-in electric | 6% |
| Floor, wall, pipeless furnace | 5% |
| Room heater | 32% |
| Fireplace, stove | 12% |
| None | 1% |

| Age of homes | |
|---|---|
| 3 years or less | 4% |
| 4 to 7 years | 11% |
| 8 to 12 years | 18% |
| 13 to 20 years | 24% |
| 21 to 30 years | 14% |
| 31 to 40 years | 11% |
| 41 years or more | 18% |

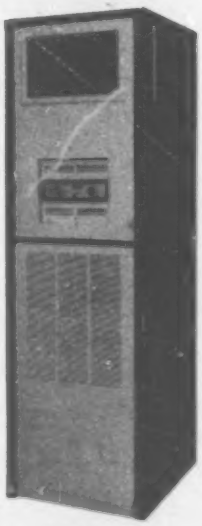
| Air conditioning saturation | |
|---|---|
| With central air conditioning | 35% |
| With one or more room units | 36% |
| No air conditioning | 29% |

| Home heating fuel | |
|---|---|
| Natural gas | 45% |
| Bottled, tank, LP gas | 21% |
| Electricity | 23% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 9% |
| Other/none | 2% |


KoldWave Mini-Aire Series
Computer Room Air Conditioning

The Mini-Aire's highly efficient water-cooled operation requires no access to outside air. Ideal for conditioning inner areas, typical of many mini-computer rooms, the Mini-Aire can be applied in offices, banks, isolated plant areas, or any other space requiring cooling and humidity control.

The self-contained control system automatically operates the cooling, humidification and dehumidification with reheat cycles. Reheat is accomplished with hot gas supplied to the reheat coil from the compressor, conserving energy.



2 & 3 Ton Capacities

KoldWave

For additional information concerning the windowless air conditioners, see your KOLDWAVE distributor or send for your free catalog.

• • •

Mail to: HEAT EXCHANGERS, INC.
P.O. Box 790, Skokie, IL 60076

Name _____
Company _____
Street _____
City _____ State _____ Zip _____

Other windowless, water-cooled air conditioners also available:
Portable Kompac series ..... 4,000 - 26,000 BTU/HR
Ducted central series ..... 10,000 - 93,000 BTU/HR

Circle 35 on Reader Action Card

# Bull's eye.

**Black & Decker introduces the lightweight with a heavyweight punch. The all new 3/4" Rotary Hammer.**

To make the hole count you have to make it in the right place. That's why our new ¾" Rotary Hammer has a unique two-finger variable speed switch. The slower starting speed lets you bull's eye the hole at the outset; then simply squeeze the trigger to punch it home.

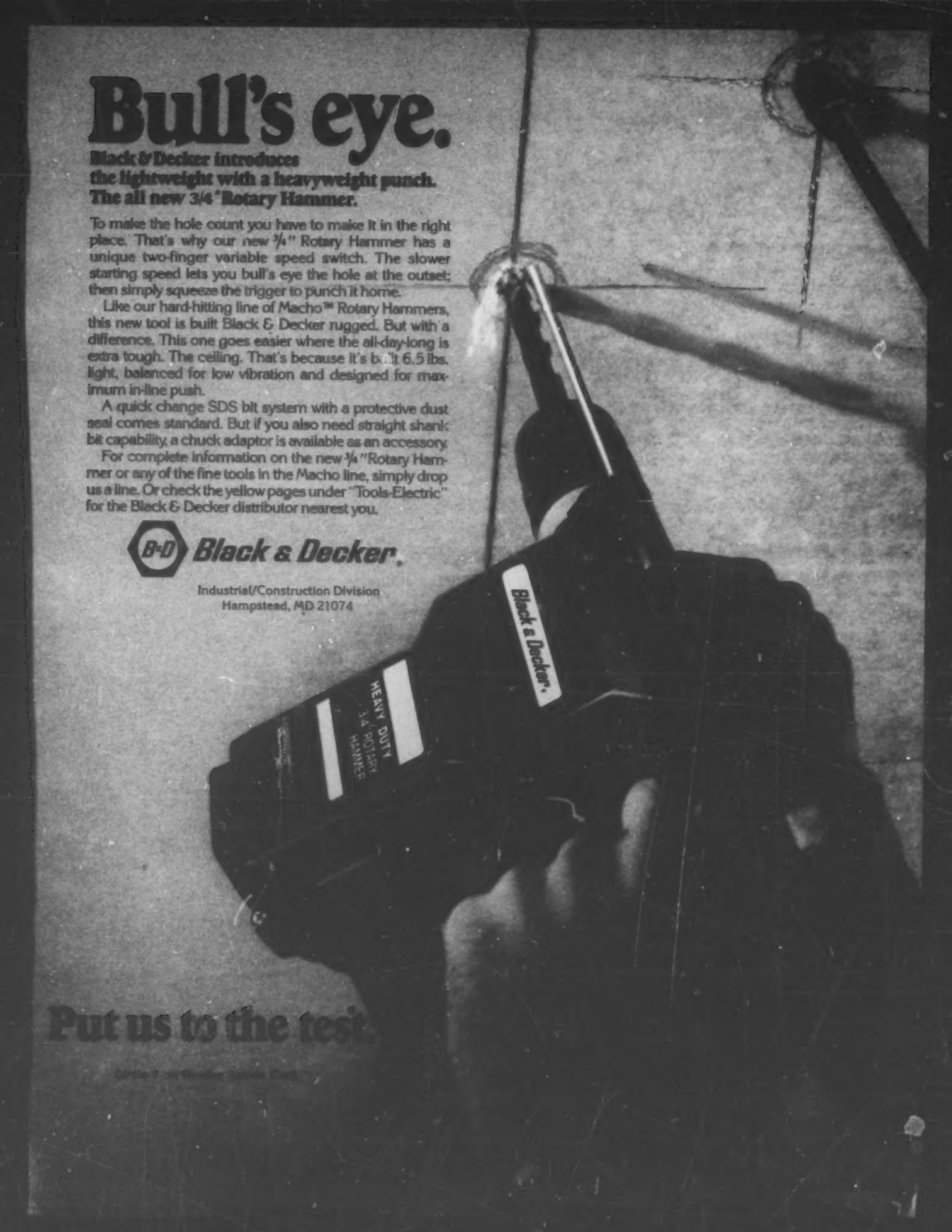
Like our hard-hitting line of Macho™ Rotary Hammers, this new tool is built Black & Decker rugged. But with a difference. This one goes easier where the all-day-long is extra tough. The ceiling. That's because it's b t 6.5 lbs. light, balanced for low vibration and designed for maximum in-line push.

A quick change SDS bit system with a protective dust seal comes standard. But if you also need straight shank bit capability, a chuck adaptor is available as an accessory.

For complete information on the new ¾" Rotary Hammer or any of the fine tools in the Macho line, simply drop us a line. Or check the yellow pages under "Tools-Electric" for the Black & Decker distributor nearest you.

B-D **Black & Decker.**

Industrial/Construction Division
Hampstead, MD 21074




**Put us to the test.**

# Missouri

**All-year housing units**
**1,965,074**

**Type of homes**

| | |
|---|---|
| Single-family homes | 73% |
| Multifamily homes | 22% |
| Mobile homes | 5% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 8% |
| Warm air furnace | 64% |
| Heat pump | 2% |
| Built-in electric | 5% |
| Floor, wall, pipeless furnace | 5% |
| Room heater | 10% |
| Fireplace, stove | 6% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 9% |
| 8 to 12 years | 13% |
| 13 to 20 years | 19% |
| 21 to 30 years | 15% |
| 31 to 40 years | 11% |
| 41 years or more | 30% |

**Average unitary air conditioner shipments, including heat pumps: 89,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 41% |
| With one or more room units | 29% |
| No air conditioning | 30% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 65% |
| Bottled, tank, LP gas | 15% |
| Electricity | 12% |
| Fuel oil/kerosene | 3% |
| Coal/coke | —% |
| Wood | 5% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| **Kansas City** | 1981 | 2,400 | 1,200 | 3,600 |
| | 1982 | 2,300 | 1,500 | 3,800 |
| | 1983 | 3,200 | 2,000 | 5,200 |
| **St. Louis** | 1981 | 4,180 | 3,130 | 7,310 |
| | 1982 | 4,330 | 3,290 | 7,620 |
| | 1983 | 4,720 | 3,900 | 8,620 |

# Montana

**All-year housing units**
**316,870**

**Type of homes**

| | |
|---|---|
| Single-family homes | 65% |
| Multifamily homes | 21% |
| Mobile homes | 14% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 10% |
| Warm air furnace | 52% |
| Heat pump | 2% |
| Built-in electric | 11% |
| Floor, wall, pipeless furnace | 4% |
| Room heater | 11% |
| Fireplace, stove | 10% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 4% |
| 4 to 7 years | 15% |
| 8 to 12 years | 13% |
| 13 to 20 years | 14% |
| 21 to 30 years | 16% |
| 31 to 40 years | 9% |
| 41 years or more | 29% |

**Average unitary air conditioner shipments, including heat pumps: 2,100**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 9% |
| With one or more room units | 11% |
| No air conditioning | 80% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 61% |
| Bottled, tank, LP gas | 7% |
| Electricity | 16% |
| Fuel oil/kerosene | 6% |
| Coal/coke | 1% |
| Wood | 9% |
| Other/none | —% |

# Danfoss helps you keep your cool

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201-529-4900

Danfoss Mfg. Ltd.
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Canada
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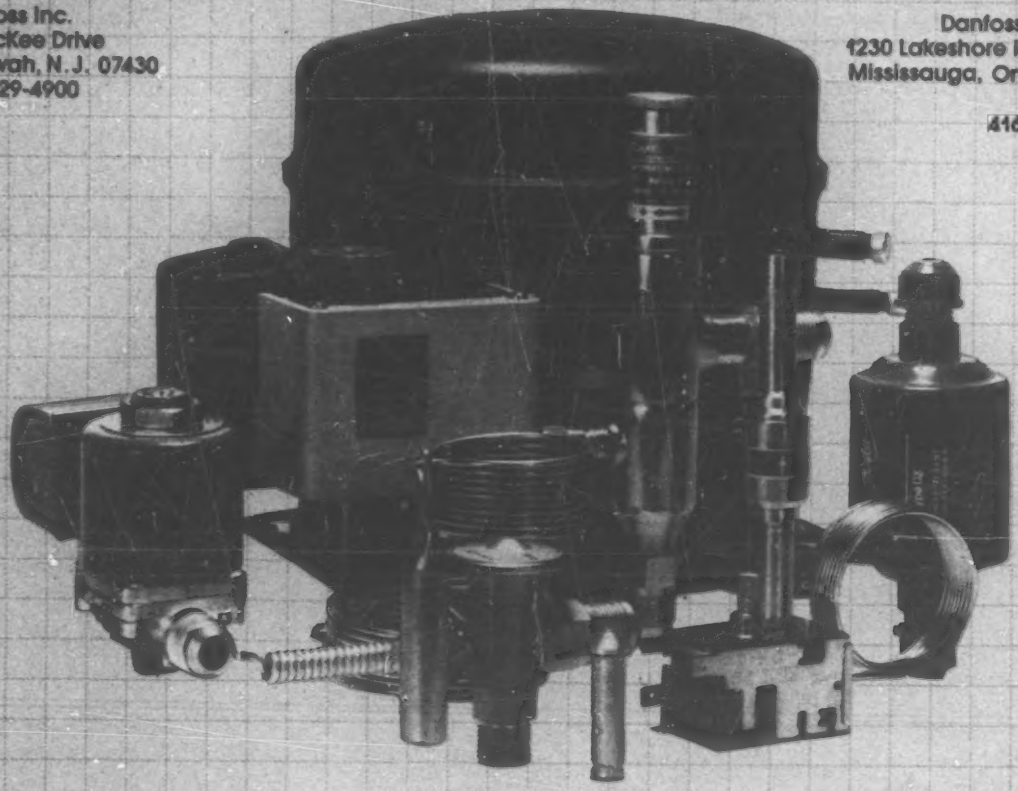

Circle 19 on Reader Action Card

# Nebraska

**All-year housing units**
**621,502**

**Average unitary air conditioner shipments, including heat pumps: 21,500**

| **Type of homes** | |
|---|---|
| Single-family homes | 75% |
| Multifamily homes | 20% |
| Mobile homes | 5% |

| **Home heating equipment saturation** | |
|---|---|
| Hydronic | 6% |
| Warm air furnace | 74% |
| Heat pump | 2% |
| Built-in electric | 3% |
| Floor, wall, pipeless furnace | 5% |
| Room heater | 8% |
| Fireplace, stove | 2% |
| None | —% |

| **Age of homes** | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 9% |
| 8 to 12 years | 11% |
| 13 to 20 years | 16% |
| 21 to 30 years | 13% |
| 31 to 40 years | 8% |
| 41 years or more | 40% |

| **Air conditioning saturation** | |
|---|---|
| With central air conditioning | 47% |
| With one or more room units | 29% |
| No air conditioning | 24% |

| **Home heating fuel** | |
|---|---|
| Natural gas | 74% |
| Bottled, tank, LP gas | 11% |
| Electricity | 9% |
| Fuel oil/kerosene | 5% |
| Coal/coke | —% |
| Wood | 1% |
| Other/none | —% |

# Nevada

**All-year housing units**
**338,155**

**Average unitary air conditioner shipments, including heat pumps: 18,200**

| **Type of homes** | |
|---|---|
| Single-family homes | 54% |
| Multifamily homes | 34% |
| Mobile homes | 12% |

| **Home heating equipment saturation** | |
|---|---|
| Hydronic | 3% |
| Warm air furnace | 62% |
| Heat pump | 10% |
| Built-in electric | 10% |
| Floor, wall, pipeless furnace | 3% |
| Room heater | 7% |
| Fireplace, stove | 4% |
| None | 1% |

| **Age of homes** | |
|---|---|
| 3 years or less | 11% |
| 4 to 7 years | 21% |
| 8 to 12 years | 20% |
| 13 to 20 years | 25% |
| 21 to 30 years | 11% |
| 31 to 40 years | 5% |
| 41 years or more | 7% |

| **Air conditioning saturation** | |
|---|---|
| With central air conditioning | 56% |
| With one or more room units | 15% |
| No air conditioning | 29% |

| **Home heating fuel** | |
|---|---|
| Natural gas | 48% |
| Bottled, tank, LP gas | 4% |
| Electricity | 38% |
| Fuel oil/kerosene | 7% |
| Coal/coke | —% |
| Wood | 3% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | **Single family** | **Multi-family** | **Total** |
|---|---|---|---|---|
| **Las Vegas** | 1981 | 4,365 | 3,135 | 7,500 |
| | 1982 | 3,320 | 3,145 | 6,465 |
| | 1983 | 3,625 | 3,350 | 6,975 |

# New Hampshire

**All-year housing units**
**344,908**

**Average unitary air conditioner shipments, including heat pumps: 1,200**

**Type of homes**

| | |
|---|---|
| Single-family homes | 62% |
| Multifamily homes | 32% |
| Mobile homes | 6% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 41% |
| Warm air furnace | 28% |
| Heat pump | 1% |
| Built-in electric | 12% |
| Floor, wall, pipeless furnace | —% |
| Room heater | 6% |
| Fireplace, stove | 12% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 9% |
| 8 to 12 years | 14% |
| 13 to 20 years | 15% |
| 21 to 30 years | 10% |
| 31 to 40 years | 7% |
| 41 years or more | 42% |

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 3% |
| With one or more room units | 22% |
| No air conditioning | 75% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 12% |
| Bottled, tank, LP gas | 3% |
| Electricity | 13% |
| Fuel oil/kerosene | 61% |
| Coal/coke | —% |
| Wood | 11% |
| Other/none | —% |

# New Jersey

**All-year housing units**
**2,678,876**

**Average unitary air conditioner shipments, including heat pumps: 8,500**

**Type of homes**

| | |
|---|---|
| Single-family homes | 59% |
| Multifamily homes | 41% |
| Mobile homes | —% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 53% |
| Warm air furnace | 33% |
| Heat pump | 1% |
| Built-in electric | 6% |
| Floor, wall, pipeless furnace | 1% |
| Room heater | 5% |
| Fireplace, stove | 1% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 5% |
| 8 to 12 years | 8% |
| 13 to 20 years | 18% |
| 21 to 30 years | 19% |
| 31 to 40 years | 12% |
| 41 years or more | 35% |

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 19% |
| With one or more room units | 45% |
| No air conditioning | 36% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 44% |
| Bottled, tank, LP gas | 1% |
| Electricity | 7% |
| Fuel oil/kerosene | 47% |
| Coal/coke | —% |
| Wood | 1% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Newark | 1981 | 1,960 | 1,080 | 3,040 |
| | 1982 | 1,810 | 1,250 | 3,060 |
| | 1983 | 2,100 | 1,500 | 3,600 |

# New Mexico

**All-year housing units**
**495,130**

**Type of homes**

| | |
|---|---|
| Single-family homes | 68% |
| Multifamily homes | 19% |
| Mobile homes | 13% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 2% |
| Warm air furnace | 54% |
| Heat pump | 1% |
| Built-in electric | 3% |
| Floor, wall, pipeless furnace | 15% |
| Room heater | 16% |
| Fireplace, stove | 9% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 6% |
| 4 to 7 years | 15% |
| 8 to 12 years | 16% |
| 13 to 20 years | 19% |
| 21 to 30 years | 20% |
| 31 to 40 years | 11% |
| 41 years or more | 13% |

**Average unitary air conditioner shipments, including heat pumps: 4,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 44% |
| With one or more room units | 17% |
| No air conditioning | 39% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 76% |
| Bottled, tank, LP gas | 10% |
| Electricity | 7% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 6% |
| Other/none | 1% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Albuquerque | 1981 | 1,090 | 310 | 1,400 |
| | 1982 | 1,040 | 680 | 1,720 |
| | 1983 | 1,300 | 800 | 2,100 |

# New York

**All-year housing units**
**6,683,103**

**Type of homes**

| | |
|---|---|
| Single-family homes | 41% |
| Multifamily homes | 57% |
| Mobile homes | 2% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 62% |
| Warm air furnace | 26% |
| Heat pump | —% |
| Built-in electric | 4% |
| Floor, wall, pipeless furnace | 1% |
| Room heater | 5% |
| Fireplace, stove | 2% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 1% |
| 4 to 7 years | 3% |
| 8 to 12 years | 6% |
| 13 to 20 years | 16% |
| 21 to 30 years | 16% |
| 31 to 40 years | 12% |
| 41 years or more | 46% |

**Average unitary air conditioner shipments, including heat pumps: 54,500**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 6% |
| With one or more room units | 34% |
| No air conditioning | 60% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 38% |
| Bottled, tank, LP gas | 1% |
| Electricity | 5% |
| Fuel oil/kerosene | 54% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Buffalo | 1981 | 1,122 | 262 | 1,384 |
| | 1982 | 900 | 129 | 1,029 |
| | 1983 | 1,000 | 200 | 1,200 |
| New York | 1981 | 3,680 | 9,065 | 12,745 |
| | 1982 | 2,930 | 8,070 | 11,000 |
| | 1983 | 3,205 | 9,665 | 12,870 |

# North Carolina

**All-year housing units**
**2,238,182**

**Type of homes**

| | |
|---|---|
| Single-family homes | 75% |
| Multifamily homes | 15% |
| Mobile homes | 10% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 3% |
| Warm air furnace | 41% |
| Heat pump | 9% |
| Built-in electric | 11% |
| Floor, wall, pipeless furnace | 5% |
| Room heater | 20% |
| Fireplace, stove | 11% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 10% |
| 8 to 12 years | 17% |
| 13 to 20 years | 23% |
| 21 to 30 years | 17% |
| 31 to 40 years | 11% |
| 41 years or more | 19% |

**Average unitary air conditioner shipments, including heat pumps: 76,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 31% |
| With one or more room units | 29% |
| No air conditioning | 40% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 13% |
| Bottled, tank, LP gas | 6% |
| Electricity | 29% |
| Fuel oil/kerosene | 40% |
| Coal/coke | —% |
| Wood | 9% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Charlotte | 1981 | 1,932 | 2,101 | 4,033 |
| | 1982 | 1,913 | 2,133 | 4,046 |
| | 1983 | 2,000 | 1,800 | 3,800 |
| Raleigh | 1981 | 2,840 | 1,775 | 4,615 |
| | 1982 | 3,080 | 1,585 | 4,665 |
| | 1983 | 3,435 | 1,740 | 5,175 |

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# North Dakota

**All-year housing units**
**252,434**

**Type of homes**

| | |
|---|---|
| Single-family homes | 65% |
| Multifamily homes | 26% |
| Mobile homes | 9% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 17% |
| Warm air furnace | 58% |
| Heat pump | 3% |
| Built-in electric | 12% |
| Floor, wall, pipeless furnace | 1% |
| Room heater | 8% |
| Fireplace, stove | 1% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 4% |
| 4 to 7 years | 15% |
| 8 to 12 years | 12% |
| 13 to 20 years | 15% |
| 21 to 30 years | 12% |
| 31 to 40 years | 6% |
| 41 years or more | 36% |

**Average unitary air conditioner shipments, including heat pumps: 5,500**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 14% |
| With one or more room units | 26% |
| No air conditioning | 60% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 40% |
| Bottled, tank, LP gas | 12% |
| Electricity | 18% |
| Fuel oil/kerosene | 28% |
| Coal/coke | 2% |
| Wood | —% |
| Other/none | —% |


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P.O. BOX 1434
SIOUX CITY, IOWA 51102

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# Ohio

**All-year housing units**
**4,091,744**

**Type of homes**

| | |
|---|---|
| Single-family homes | 69% |
| Multifamily homes | 27% |
| Mobile homes | 4% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 10% |
| Warm air furnace | 69% |
| Heat pump | 4% |
| Built-in electric | 7% |
| Floor, wall, pipeless furnace | 2% |
| Room heater | 6% |
| Fireplace, stove | 2% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 8% |
| 8 to 12 years | 11% |
| 13 to 20 years | 17% |
| 21 to 30 years | 17% |
| 31 to 40 years | 12% |
| 41 years or more | 32% |

**Average unitary air conditioner shipments, including heat pumps: 91,500**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 23% |
| With one or more room units | 24% |
| No air conditioning | 53% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 71% |
| Bottled, tank, LP gas | 3% |
| Electricity | 14% |
| Fuel oil/kerosene | 10% |
| Coal/coke | 1% |
| Wood | 1% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Cleveland | 1981 | 1,600 | 1,395 | 2,995 |
| | 1982 | 1,200 | 600 | 1,800 |
| | 1983 | 1,500 | 700 | 2,200 |
| Columbus | 1981 | 2,020 | 1,695 | 3,715 |
| | 1982 | 2,000 | 1,600 | 3,600 |
| | 1983 | 2,200 | 1,800 | 4,000 |

# Oklahoma

**All-year housing units**
**1,234,698**

**Type of homes**

| | |
|---|---|
| Single-family homes | 79% |
| Multifamily homes | 15% |
| Mobile homes | 6% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 1% |
| Warm air furnace | 49% |
| Heat pump | 2% |
| Built-in electric | 3% |
| Floor, wall, pipeless furnace | 18% |
| Room heater | 19% |
| Fireplace, stove | 8% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 4% |
| 4 to 7 years | 11% |
| 8 to 12 years | 14% |
| 13 to 20 years | 19% |
| 21 to 30 years | 17% |
| 31 to 40 years | 12% |
| 41 years or more | 23% |

**Average unitary air conditioner shipments, including heat pumps: 55,500**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 44% |
| With one or more room units | 37% |
| No air conditioning | 19% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 71% |
| Bottled, tank, LP gas | 9% |
| Electricity | 16% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 4% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Tulsa | 1981 | 2,237 | 1,709 | 3,946 |
| | 1982 | 2,974 | 3,780 | 6,754 |
| | 1983 | 3,375 | 2,525 | 5,900 |

# Oregon

**All-year housing units**
**1,071,239**

**Type of homes**

| | |
|---|---|
| Single-family homes | 70% |
| Multifamily homes | 22% |
| Mobile homes | 8% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 4% |
| Warm air furnace | 39% |
| Heat pump | 2% |
| Built-in electric | 29% |
| Floor, wall, pipeless furnace | 3% |
| Room heater | 9% |
| Fireplace, stove | 14% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 5% |
| 4 to 7 years | 14% |
| 8 to 12 years | 14% |
| 13 to 20 years | 17% |
| 21 to 30 years | 15% |
| 31 to 40 years | 12% |
| 41 years or more | 23% |

**Average unitary air conditioner shipments, including heat pumps: 16,500**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 7% |
| With one or more room units | 10% |
| No air conditioning | 83% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 24% |
| Bottled, tank, LP gas | 2% |
| Electricity | 42% |
| Fuel oil/kerosene | 19% |
| Coal/coke | —% |
| Wood | 13% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Portland | 1981 | 5,422 | 3,106 | 8,528 |
| | 1982 | 3,052 | 1,556 | 4,608 |
| | 1983 | 4,700 | 2,300 | 7,000 |
| Salem | 1981 | 1,072 | 341 | 1,413 |
| | 1982 | 586 | 178 | 764 |
| | 1983 | 920 | 320 | 1,240 |

# Pennsylvania

**All-year housing units**
**4,492,156**

**Type of homes**

| | |
|---|---|
| Single-family homes | 71% |
| Multifamily homes | 26% |
| Mobile homes | 3% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 35% |
| Warm air furnace | 45% |
| Heat pump | 2% |
| Built-in electric | 7% |
| Floor, wall, pipeless furnace | 2% |
| Room heater | 6% |
| Fireplace, stove | 3% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 2% |
| 4 to 7 years | 6% |
| 8 to 12 years | 9% |
| 13 to 20 years | 13% |
| 21 to 30 years | 15% |
| 31 to 40 years | 10% |
| 41 years or more | 45% |

**Average unitary air conditioner shipments, including heat pumps: 59,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 12% |
| With one or more room units | 29% |
| No air conditioning | 59% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 49% |
| Bottled, tank, LP gas | 1% |
| Electricity | 10% |
| Fuel oil/kerosene | 34% |
| Coal/coke | 4% |
| Wood | 2% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Philadelphia | 1981 | 6,220 | 3,070 | 9,290 |
| | 1982 | 5,680 | 2,700 | 8,380 |
| | 1983 | 7,000 | 3,300 | 10,300 |
| Pittsburgh | 1981 | 2,483 | 1,514 | 3,997 |
| | 1982 | 1,804 | 1,591 | 3,395 |
| | 1983 | 2,250 | 2,000 | 4,250 |

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## Comfort-Aire®

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## Comfort-Aire®

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## Comfort-Aire®

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# Rhode Island

**All-year housing units**
**362,808**

**Average unitary air conditioner shipments, including heat pumps: 2,100**

**Type of homes**

| | |
|---|---|
| Single-family homes | 54% |
| Multifamily homes | 45% |
| Mobile homes | 1% |

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 4% |
| With one or more room units | 28% |
| No air conditioning | 68% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 60% |
| Warm air furnace | 19% |
| Heat pump | 1% |
| Built-in electric | 5% |
| Floor, wall, pipeless furnace | 1% |
| Room heater | 10% |
| Fireplace, stove | 4% |
| None | —% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 33% |
| Bottled, tank, LP gas | 1% |
| Electricity | 6% |
| Fuel oil/kerosene | 58% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 5% |
| 8 to 12 years | 8% |
| 13 to 20 years | 14% |
| 21 to 30 years | 15% |
| 31 to 40 years | 11% |
| 41 years or more | 44% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Rhode Island | 1981 | 1,390 | 1,830 | 3,220 |
| | 1982 | 1,350 | 1,065 | 2,415 |
| | 1983 | 1,500 | 1,800 | 3,300 |

# South Carolina

**All-year housing units**
**1,133,484**

**Average unitary air conditioner shipments, including heat pumps: 39,500**

**Type of homes**

| | |
|---|---|
| Single-family homes | 75% |
| Multifamily homes | 15% |
| Mobile homes | 10% |

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 37% |
| With one or more room units | 31% |
| No air conditioning | 32% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 1% |
| Warm air furnace | 41% |
| Heat pump | 11% |
| Built-in electric | 8% |
| Floor, wall, pipeless furnace | 5% |
| Room heater | 24% |
| Fireplace, stove | 10% |
| None | —% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 27% |
| Bottled, tank, LP gas | 12% |
| Electricity | 31% |
| Fuel oil/kerosene | 23% |
| Coal/coke | —% |
| Wood | 7% |
| Other/none | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 4% |
| 4 to 7 years | 12% |
| 8 to 12 years | 18% |
| 13 to 20 years | 22% |
| 21 to 30 years | 17% |
| 31 to 40 years | 11% |
| 41 years or more | 16% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Charleston | 1981 | 1,695 | 910 | 2,605 |
| | 1982 | 2,125 | 1,750 | 3,875 |
| | 1983 | 2,380 | 1,995 | 4,375 |
| Columbia | 1981 | 1,135 | 435 | 1,570 |
| | 1982 | 1,410 | 565 | 1,975 |
| | 1983 | 1,595 | 680 | 2,275 |

# South Dakota

**All-year housing units**
**269,322**

**Type of homes**

| | |
|---|---|
| Single-family homes | 72% |
| Multifamily homes | 19% |
| Mobile homes | 9% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 10% |
| Warm air furnace | 60% |
| Heat pump | 3% |
| Built-in electric | 9% |
| Floor, wall, pipeless furnace | 4% |
| Room heater | 10% |
| Fireplace, stove | 4% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 12% |
| 8 to 12 years | 11% |
| 13 to 20 years | 14% |
| 21 to 30 years | 12% |
| 31 to 40 years | 7% |
| 41 years or more | 41% |

**Average unitary air conditioner shipments, including heat pumps: 6,000**

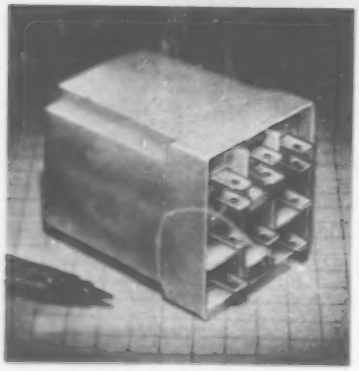
**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 25% |
| With one or more room units | 34% |
| No air conditioning | 41% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 42% |
| Bottled, tank, LP gas | 17% |
| Electricity | 15% |
| Fuel oil/kerosene | 23% |
| Coal/coke | —% |
| Wood | 3% |
| Other/none | —% |


RUGGED



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# Tennessee

**All-year housing units**
**1,735,456**

**Type of homes**

| | |
|---|---|
| Single-family homes | 75% |
| Multifamily homes | 18% |
| Mobile homes | 7% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 1% |
| Warm air furnace | 31% |
| Heat pump | 8% |
| Built-in electric | 24% |
| Floor, wall, pipeless furnace | 6% |
| Room heater | 12% |
| Fireplace, stove | 18% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 12% |
| 8 to 12 years | 16% |
| 13 to 20 years | 24% |
| 21 to 30 years | 17% |
| 31 to 40 years | 12% |
| 41 years or more | 16% |

**Average unitary air conditioner shipments, including heat pumps: 68,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 33% |
| With one or more room units | 40% |
| No air conditioning | 27% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 28% |
| Bottled, tank, LP gas | 5% |
| Electricity | 49% |
| Fuel oil/kerosene | 4% |
| Coal/coke | 3% |
| Wood | 11% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| **Memphis** | 1981 | 1,915 | 120 | 2,035 |
| | 1982 | 1,715 | 725 | 2,440 |
| | 1983 | 1,995 | 760 | 2,755 |
| **Nashville** | 1981 | 412 | 920 | 1,332 |
| | 1982 | 553 | 1,460 | 2,013 |
| | 1983 | 550 | 1,750 | 2,300 |


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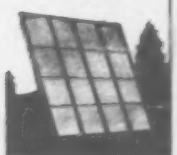
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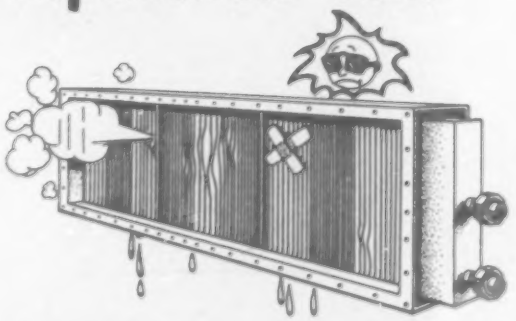
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# Texas

**All-year housing units**
**5,505,016**

**Type of homes**

| | |
|---|---|
| Single-family homes | 71% |
| Multifamily homes | 25% |
| Mobile homes | 4% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 1% |
| Warm air furnace | 54% |
| Heat pump | 3% |
| Built-in electric | 4% |
| Floor, wall, pipeless furnace | 7% |
| Room heater | 23% |
| Fireplace, stove | 8% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 6% |
| 4 to 7 years | 14% |
| 8 to 12 years | 14% |
| 13 to 20 years | 21% |
| 21 to 30 years | 19% |
| 31 to 40 years | 13% |
| 41 years or more | 13% |

**Average unitary air conditioner shipments, including heat pumps: 350,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 53% |
| With one or more room units | 30% |
| No air conditioning | 17% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 64% |
| Bottled, tank, LP gas | 9% |
| Electricity | 26% |
| Fuel oil/kerosene | —% |
| Coal/coke | —% |
| Wood | 1% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Dallas | 1981 | 20,400 | 9,400 | 29,800 |
| | 1982 | 24,600 | 20,900 | 45,500 |
| | 1983 | 25,500 | 25,800 | 51,300 |
| Houston | 1981 | 27,720 | 16,580 | 44,300 |
| | 1982 | 31,990 | 34,100 | 66,090 |
| | 1983 | 29,500 | 26,000 | 55,500 |

# Utah

**All-year housing units**
**481,701**

**Type of homes**

| | |
|---|---|
| Single-family homes | 72% |
| Multifamily homes | 23% |
| Mobile homes | 5% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 5% |
| Warm air furnace | 78% |
| Heat pump | 1% |
| Built-in electric | 6% |
| Floor, wall, pipeless furnace | 3% |
| Room heater | 5% |
| Fireplace, stove | 2% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 6% |
| 4 to 7 years | 16% |
| 8 to 12 years | 14% |
| 13 to 20 years | 18% |
| 21 to 30 years | 16% |
| 31 to 40 years | 10% |
| 41 years or more | 20% |

**Average unitary air conditioner shipments, including heat pumps: 8,500**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 30% |
| With one or more room units | 18% |
| No air conditioning | 52% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 81% |
| Bottled, tank, LP gas | 2% |
| Electricity | 10% |
| Fuel oil/kerosene | 3% |
| Coal/coke | 2% |
| Wood | 2% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Salt Lake City | 1981 | 2,300 | 1,650 | 3,950 |
| | 1982 | 1,900 | 1,600 | 3,500 |
| | 1983 | 2,570 | 2,096 | 4,666 |

# Vermont

**All-year housing units**
**194,063**

**Type of homes**

| | |
|---|---|
| Single-family homes | 64% |
| Multifamily homes | 29% |
| Mobile homes | 7% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 30% |
| Warm air furnace | 34% |
| Heat pump | 1% |
| Built-in electric | 9% |
| Floor, wall, pipeless furnace | 1% |
| Room heater | 7% |
| Fireplace, stove | 18% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 9% |
| 8 to 12 years | 12% |
| 13 to 20 years | 14% |
| 21 to 30 years | 9% |
| 31 to 40 years | 6% |
| 41 years or more | 47% |

**Average unitary air conditioner shipments, including heat pumps: 500**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 1% |
| With one or more room units | 9% |
| No air conditioning | 90% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 6% |
| Bottled, tank, LP gas | 5% |
| Electricity | 10% |
| Fuel oil/kerosene | 62% |
| Coal/coke | —% |
| Wood | 17% |
| Other/none | —% |

# Virginia

**All-year housing units**
**2,007,833**

**Type of homes**

| | |
|---|---|
| Single-family homes | 73% |
| Multifamily homes | 22% |
| Mobile homes | 5% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 13% |
| Warm air furnace | 42% |
| Heat pump | 7% |
| Built-in electric | 12% |
| Floor, wall, pipeless furnace | 5% |
| Room heater | 13% |
| Fireplace, stove | 8% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 10% |
| 8 to 12 years | 17% |
| 13 to 20 years | 24% |
| 21 to 30 years | 18% |
| 31 to 40 years | 12% |
| 41 years or more | 16% |

**Average unitary air conditioner shipments, including heat pumps: 45,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 36% |
| With one or more room units | 28% |
| No air conditioning | 36% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 31% |
| Bottled, tank, LP gas | 2% |
| Electricity | 25% |
| Fuel oil/kerosene | 34% |
| Coal/coke | 1% |
| Wood | 7% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Norfolk | 1981 | 2,394 | 1,871 | 4,265 |
| | 1982 | 3,600 | 2,750 | 6,350 |
| | 1983 | 4,000 | 2,800 | 6,800 |
| Richmond | 1981 | 3,184 | 547 | 3,731 |
| | 1982 | 2,648 | 342 | 2,990 |
| | 1983 | 3,600 | 450 | 4,050 |

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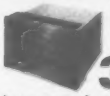

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Inexpensive to buy, install, operate and maintain. Perfect for multihousing units, schools or nursing homes. Available in capacities from 7,000 to 15,000 BTUH cooling and 8,800 to 17,000 BTUH heating, either ducted or non-ducted. With special Fedders design features to make Maxizone quiet and efficient in either mode.

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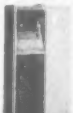

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# Washington

**All-year housing units**
**1,657,556**

**Type of homes**

| | |
|---|---|
| Single-family homes | 70% |
| Multifamily homes | 24% |
| Mobile homes | 6% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 5% |
| Warm air furnace | 41% |
| Heat pump | 4% |
| Built-in electric | 35% |
| Floor, wall, pipeless furnace | 2% |
| Room heater | 7% |
| Fireplace, stove | 6% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 6% |
| 4 to 7 years | 15% |
| 8 to 12 years | 11% |
| 13 to 20 years | 19% |
| 21 to 30 years | 15% |
| 31 to 40 years | 13% |
| 41 years or more | 21% |

**Average unitary air conditioner shipments, including heat pumps: 13,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 7% |
| With one or more room units | 8% |
| No air conditioning | 85% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 23% |
| Bottled, tank, LP gas | 1% |
| Electricity | 53% |
| Fuel oil/kerosene | 18% |
| Coal/coke | —% |
| Wood | 5% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| Seattle | 1981 | 6,050 | 7,140 | 13,190 |
| | 1982 | 3,920 | 4,570 | 8,490 |
| | 1983 | 4,320 | 5,050 | 9,370 |
| Spokane | 1981 | 630 | 534 | 1,164 |
| | 1982 | 599 | 344 | 943 |
| | 1983 | 700 | 500 | 1,200 |

# West Virginia

**All-year housing units**
**734,166**

**Type of homes**

| | |
|---|---|
| Single-family homes | 76% |
| Multifamily homes | 14% |
| Mobile homes | 10% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 5% |
| Warm air furnace | 42% |
| Heat pump | 3% |
| Built-in electric | 11% |
| Floor, wall, pipeless furnace | 9% |
| Room heater | 19% |
| Fireplace, stove | 11% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 10% |
| 8 to 12 years | 11% |
| 13 to 20 years | 13% |
| 21 to 30 years | 13% |
| 31 to 40 years | 14% |
| 41 years or more | 36% |

**Average unitary air conditioner shipments, including heat pumps: 13,000**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 14% |
| With one or more room units | 25% |
| No air conditioning | 61% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 59% |
| Bottled, tank, LP gas | 2% |
| Electricity | 19% |
| Fuel oil/kerosene | 10% |
| Coal/coke | 6% |
| Wood | 4% |
| Other/none | —% |

# Wisconsin

**All-year housing units**
**1,749,761**

**Type of homes**

| | |
|---|---|
| Single-family homes | 69% |
| Multifamily homes | 27% |
| Mobile homes | 4% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 15% |
| Warm air furnace | 67% |
| Heat pump | 1% |
| Built-in electric | 5% |
| Floor, wall, pipeless furnace | 2% |
| Room heater | 7% |
| Fireplace, stove | 3% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 3% |
| 4 to 7 years | 9% |
| 8 to 12 years | 11% |
| 13 to 20 years | 15% |
| 21 to 30 years | 15% |
| 31 to 40 years | 11% |
| 41 years or more | 36% |

**Average unitary air conditioner shipments, including heat pumps: 22,500**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 13% |
| With one or more room units | 25% |
| No air conditioning | 62% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 59% |
| Bottled, tank, LP gas | 8% |
| Electricity | 6% |
| Fuel oil/kerosene | 25% |
| Coal/coke | —% |
| Wood | 2% |
| Other/none | —% |

**Metro area housing forecast (in units)**

| | | Single family | Multi-family | Total |
|---|---|---|---|---|
| **Milwaukee** | 1981 | 1,045 | 1,807 | 2,852 |
| | 1982 | 700 | 1,250 | 1,950 |
| | 1983 | 700 | 1,500 | 2,200 |
| **Madison** | 1981 | 665 | 1,005 | 1,670 |
| | 1982 | 445 | 330 | 775 |
| | 1983 | 650 | 700 | 1,350 |

# Wyoming

**All-year housing units**
**182,352**

**Type of homes**

| | |
|---|---|
| Single-family homes | 62% |
| Multifamily homes | 19% |
| Mobile homes | 19% |

**Home heating equipment saturation**

| | |
|---|---|
| Hydronic | 11% |
| Warm air furnace | 61% |
| Heat pump | 1% |
| Built-in electric | 8% |
| Floor, wall, pipeless furnace | 6% |
| Room heater | 9% |
| Fireplace, stove | 4% |
| None | —% |

**Age of homes**

| | |
|---|---|
| 3 years or less | 9% |
| 4 to 7 years | 18% |
| 8 to 12 years | 14% |
| 13 to 20 years | 13% |
| 21 to 30 years | 13% |
| 31 to 40 years | 9% |
| 41 years or more | 24% |

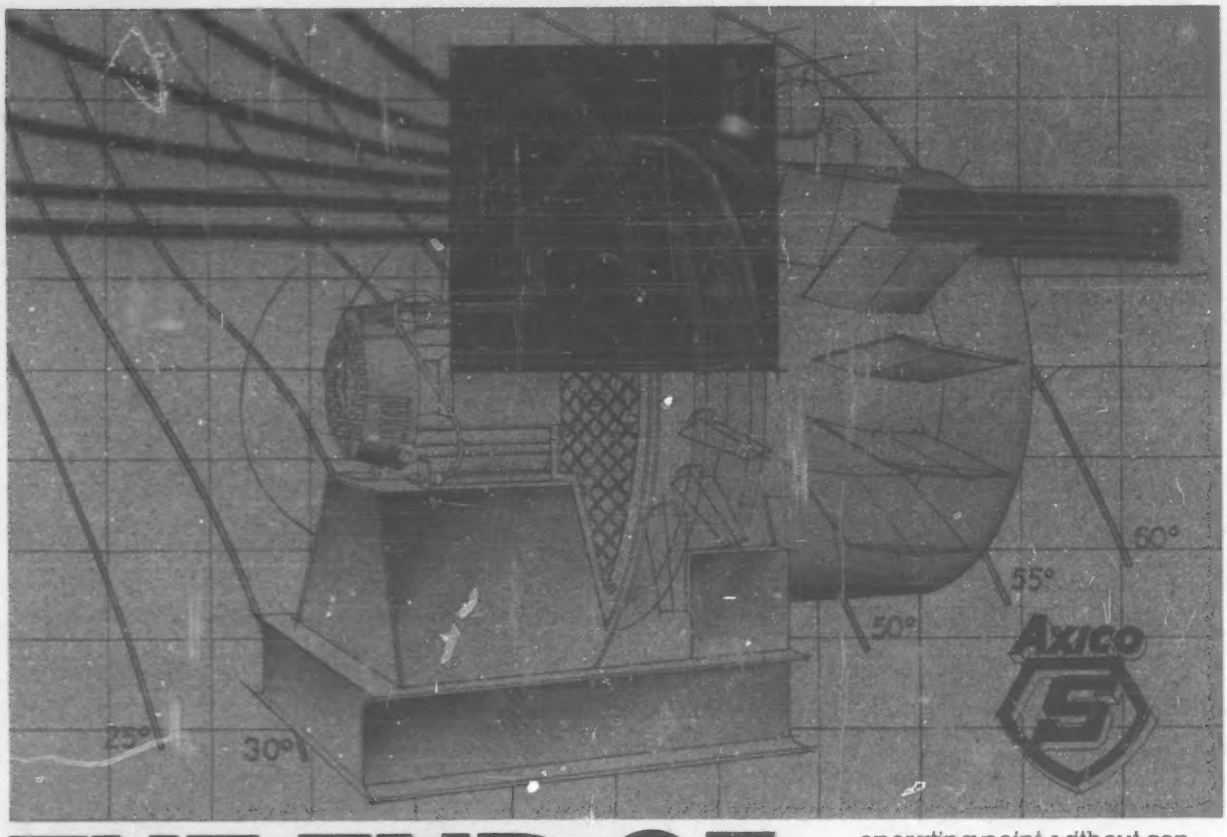
**Average unitary air conditioner shipments, including heat pumps: 900**

**Air conditioning saturation**

| | |
|---|---|
| With central air conditioning | 7% |
| With one or more room units | 13% |
| No air conditioning | 80% |

**Home heating fuel**

| | |
|---|---|
| Natural gas | 77% |
| Bottled, tank, LP gas | 8% |
| Electricity | 11% |
| Fuel oil/kerosene | 1% |
| Coal/coke | 1% |
| Wood | 2% |
| Other/none | —% |

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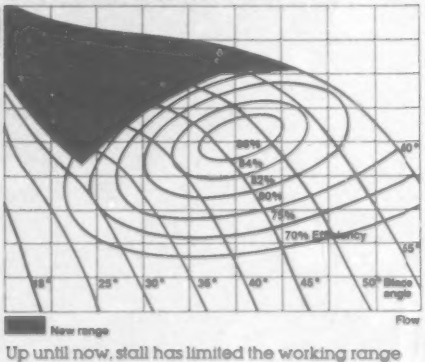


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# Comfort in construction

At the turn of the decade, we advanced a theory that the U.S. was well along in the first phase of a transition in which influences related to energy cost and availability were triggering significant changes in approaches to marketing home comfort systems.

It was an awareness of the need for change to avert needlessly high energy costs. The second phase — departures from traditional equipment designs based on new technology and a growing consumer willingness to pay more for higher efficiencies — had its beginnings in 1979 but would not, we felt, fully develop for a couple of years.

The third phase, as we saw it then, would begin in 1983 and last into the foreseeable future. It would be a time when public and government education would be largely complete so that the job of providing substantially more efficient comfort heating and cooling systems for both new and existing homes could go hand in hand.

### Heating

The industry is both on time and on target.

In the days of cheap and abundant natural gas, there was little incentive to purchase anything better than an inherently reliable atmospheric gas furnace or boiler with a standing pilot. On an annual basis, it had to press hard to achieve efficiencies in the 60% range.

With the first stage of natural gas decontrol in 1978, a move to clear the supply logjam that had produced increasingly severe curtailments for a decade, came price increases that, today, are four to six times those of the 1970's in many prime markets.

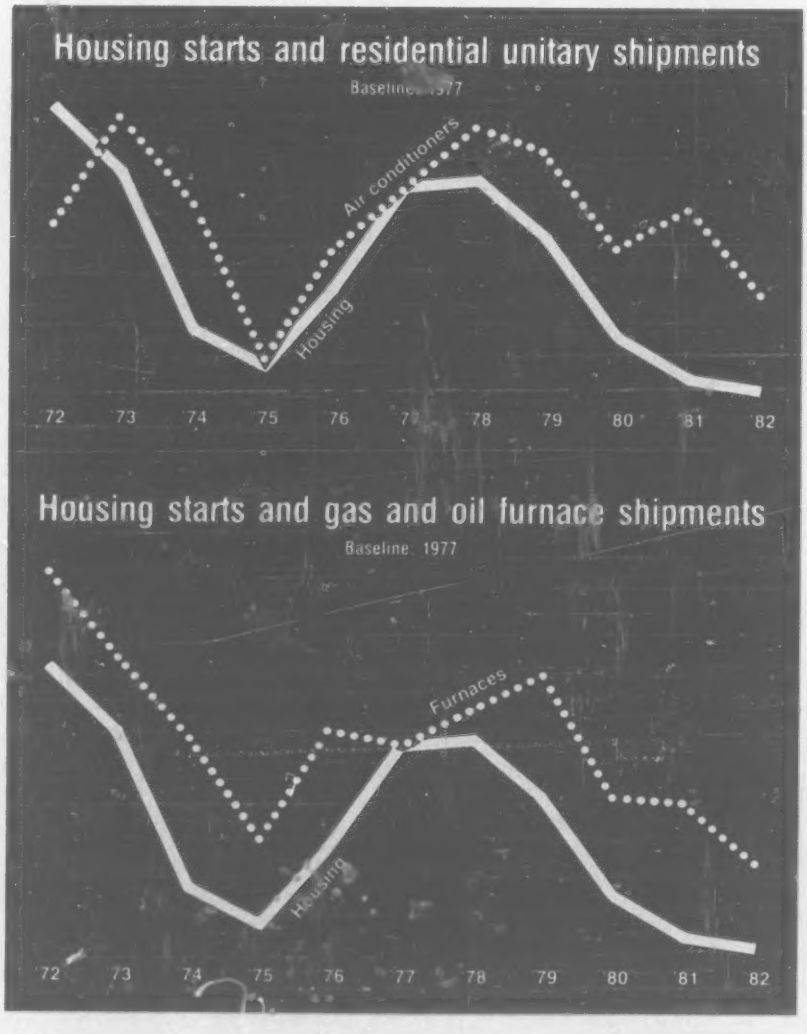
The first solution was an electronic ignition device to replace the standing pilot and a vent damper to cut down on standby losses which raised annual efficiencies by a few points. Then came power burners and recuperative furnaces which established a new high-efficiency class with annual efficiencies in the 80% to 85% range. They stopped just short of condensing the flue gases.

A pulse combustion boiler had been on the scene for a couple of years when, last summer, it was joined by a pulse combustion furnace and another condensing furnace that established a new ultra-high-efficiency class in the 90% to 95% annual efficiency range.

At the same time, flame retention head and other high-efficiency burners were being added to new and existing oil-fired furnaces and boilers. Electric resistance heat, the darling of the 1960's when it was touted for its 100% efficiency, was being replaced on an ever widening scale by heat pumps with efficiencies of 200% to 300%.

A Department of Energy (DOE) study indicates that, in the two-year 1979 and 1980 period, 2.5 million American households added clock thermostats, 500,000 added vent dampers, one million installed spark ignition systems on gas furnaces, and 1.3 million insulated their ductwork.

In concert with these equipment changes, National Association of



Home Builders' surveys indicate that ceiling insulation levels in new homes increased from R-13 in 1974 to R-25 in 1980, and R-30 in the more northern states. Double glazing increased from 25% to 60% of homes in the same period and 3% were built with triple glazing.

During the early stages of the transition, equipment upgrading was largely confined to new homes, as builders discovered energy-saving was a saleable feature, and in replacements. But in the last couple of years, more homeowners are replacing old equipment in good working order so they can take advantage of the efficiency improvement. One ultra-high-efficiency furnace manufacturer reports that three out of four units it sells replace existing units in good working order.

But to cap a year in which Murphy's Law held sway, the fifth mildest winter since 1932 has not promoted conversions to high-efficiency equipment in the same way a cold winter would have. If there was a saving grace, it was a report from the National Oceanic and Atmospheric Administration that the mild 1982-1983 winter had saved Americans $3.8 billion in heating costs, down 8% from what outlays would have been in a typical winter.

### Cooling

The story is even more evident with central air conditioners and heat pumps.

In the late 1960's and early 1970's, condenser surfaces got smaller and condenser fan speeds got higher as manufacturers tried to hold the line on price in a competitive market dominated by builder purchases. The EER's (Energy Efficiency Ratios) of five and six did not matter much as long as first cost was low because electricity was cheap.

But as electricity costs doubled and tripled and as the growing southern market, where seasonal cooling costs rival the seasonal heating costs of the North, became more important, the industry began to develop equipment to meet the need.

Condenser surfaces expanded and multiple-speed condenser fans were added, moves that made outdoor units much quieter as well. Compressors were improved and two-

TURN TO PAGE 96

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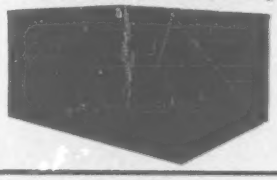

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# Heating-cooling-fuel new home characteristics

**(Based on two quarters revised, one quarter preliminary Census Bureau figures. All numbers are rounded.)**

| | 1981 | | | | | 1982 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | U.S. total | Northeast | North Central | South | West | U.S. total | Northeast | North Central | South | West |
| **Single-family homes completed** | **624,000** | 66,000<br>10.5% | 104,000<br>16.6% | 308,000<br>49.3% | 146,000<br>23.3% | **442,000** | 53,000<br>11.9% | 65,000<br>14.7% | 238,000<br>53.8% | 86,000<br>19.4% |
| **Space heating fuel** | | | | | | | | | | |
| Gas | 261,000<br>41.8% | 22,000<br>33.3% | 65,000<br>63.5% | 97,000<br>31.5% | 76,000<br>52.1% | 179,000<br>40.4% | 21,000<br>39.6% | 38,000<br>58.5% | 77,000<br>32.3% | 43,000<br>50.0% |
| Electricity | 311,000<br>49.9% | 26,000<br>39.3% | 29,000<br>27.9% | 198,000<br>64.2% | 59,000<br>40.4% | 222,000<br>50.2% | 18,000<br>33.9% | 17,000<br>26.1% | 152,000<br>63.9% | 36,000<br>41.9% |
| Oil | 12,000<br>1.9% | 8,000<br>12.1% | 3,000<br>2.8% | 3,000<br>1.0% | —<br>— | 12,000<br>2.7% | 9,000<br>16.9% | 3,000<br>4.6% | —<br>— | —<br>— |
| Other/none | 40,000<br>6.4% | 10,000<br>15.1% | 7,000<br>6.8% | 10,000<br>3.2% | 11,000<br>7.6% | 31,000<br>6.3% | 5,000<br>9.6% | 9,000<br>10.8% | 8,000<br>3.8% | 8,000<br>8.1% |
| **Heating systems type** | | | | | | | | | | |
| Warm air furnace | 356,000<br>57.1% | 21,000<br>31.8% | 74,000<br>71.1% | 170,000<br>55.2% | 92,000<br>63.1% | 235,000<br>53.1% | 17,000<br>32.1% | 44,000<br>67.4% | 126,000<br>52.9% | 47,000<br>54.7% |
| Heat pump | 151,000<br>24.2% | 8,000<br>12.1% | 11,000<br>10.6% | 98,000<br>31.8% | 33,000<br>22.6% | 118,000<br>26.6% | 6,000<br>11.3% | 5,000<br>7.8% | 84,000<br>35.3% | 24,000<br>27.9% |
| Hydronic | 19,000<br>3.1% | 13,000<br>19.7% | 3,000<br>2.9% | —<br>— | —<br>— | 18,000<br>4.0% | 16,000<br>30.1% | 2,000<br>3.0% | —<br>— | —<br>— |
| Electric baseboard/ panel/radiant | 54,000<br>8.6% | 15,000<br>22.7% | 11,000<br>10.5% | 18,000<br>5.8% | 10,000<br>6.9% | 34,000<br>7.7% | 14,000<br>26.1% | 15,000<br>23.0% | 10,000<br>4.2% | 7,000<br>8.1% |
| Other/none | 44,000<br>7.0% | 9,000<br>13.7% | 5,000<br>4.8% | 20,000<br>6.5% | 11,000<br>7.5% | 37,000<br>8.6% | 3,000<br>0.4% | 7,000<br>0.4% | 20,000<br>7.6% | 7,000<br>9.3% |
| **With central air conditioning** | 401,000<br>64.3% | 18,000<br>27.3% | 50,000<br>48.0% | 259,000<br>84.0% | 73,000<br>50.1% | 294,000<br>66.5% | 15,000<br>28.3% | 29,000<br>44.6% | 204,000<br>85.7% | 46,000<br>53.5% |
| **Multifamily homes completed** | **324,000** | 31,000<br>9.5% | 59,000<br>18.2% | 153,000<br>47.3% | 81,000<br>25.0% | **269,000** | 23,000<br>8.5% | 38,000<br>14.1% | 147,000<br>54.6% | 61,000<br>22.7% |
| **Space heating fuel** | | | | | | | | | | |
| Gas | 101,000<br>31.2% | 18,000<br>58.0% | 29,000<br>49.1% | 19,000<br>12.4% | 33,000<br>40.7% | 76,000<br>28.2% | 12,000<br>52.1% | 25,000<br>65.7% | 15,000<br>10.2% | 26,000<br>42.6% |
| Electricity | 215,000<br>66.3% | 8,000<br>25.8% | 30,000<br>50.8% | 133,000<br>86.9% | 44,000<br>54.3% | 183,000<br>68.0% | 8,000<br>34.7% | 12,000<br>31.5% | 130,000<br>88.4% | 33,000<br>54.0% |
| Oil | 6,000<br>1.9% | 5,000<br>16.1% | —<br>— | —<br>— | —<br>— | 5,000<br>1.8% | 3,000<br>13.2% | —<br>— | 1,000<br>0.6% | —<br>— |
| Other/none | 2,000<br>0.6% | —<br>— | —<br>— | 1,000<br>0.6% | 4,000<br>4.9% | 5,000<br>1.8% | —<br>— | 1,000<br>2.8% | 1,000<br>0.6% | 2,000<br>3.4% |
| **With air conditioning** | 275,000<br>84.8% | 26,000<br>83.8% | 49,000<br>83.0% | 148,000<br>96.7% | 54,000<br>66.6% | 238,000<br>88.4% | 16,000<br>69.5% | 31,000<br>81.5% | 143,000<br>97.3% | 46,000<br>75.4% |

FROM PAGE 93

speed models were offered; larger equipment had two or more compressors to provide more modulation.

The performance of heat pumps in northern applications was improved. Cooling performance, although still a compromise, was upgraded to the point where it rivaled the best straight-cooling units. Ultimately came inverter drives with even more modulating capability. Defrosting methods and controls were improved.

According to our records, these moves started to show in the marketplace in 1973, which meant that laboratory work was going on long before that. We arbitrarily picked an EER of 7.5 as the line separating high efficiency equipment from the rest and, through 1976, we doubt that much more than 15% of equipment shipped was in that category.

That picture has changed dramatically. The Air-Conditioning and Refrigeration Institute (ARI) reported that, through the first nine months of 1982, nearly four out of five (79%) of residential unitary air conditioners and heat pumps shipped by U.S. manufacturers had an SEER (Seasonal Energy Efficiency Ratio) of 7.5 or more. Of these, 45.7% were above 8.5 and 4.6% above 9.5.

Taken separately, 79% of all DOE-covered air conditioners had an SEER of 7.5 or more, 70% had an SEER of eight or more, and 46% had an SEER of 8.5 or more.

Similarly, 75% of all DOE-covered heat pumps had an SEER of 7.5 or more in the cooling mode, 41% had an SEER of eight or more, and 3% had an SEER of 8.5 or more.

Back in 1976, only 23.4% of unitary air conditioners and heat pumps had an EER of 7.5 or more, and only 5.2% could make it past an SEER of 8.5

Despite the fact that a few states have established minimum efficiencies for home heating and cooling products, we feel it is a clear-cut example of the effectiveness of the free market in responding to a consumer need.

A major factor in the acceptance of higher efficiencies — at a significantly higher first cost — has been the multitude of incentive programs launched by summer-peaking electric utilities seeking to postpone the addition of more generating capacity. Another factor, particularly in the education of homeowners, has been the many residential conservation service (RCS) home energy audit programs also offered by many utilities. Contractors, too, have been a major contributor in the advance.

However, the fact sheets mandated for furnaces and boilers by the Federal Trade Commission have been a flop, according to a General Accounting Office report to Congress. A survey it conducted re-

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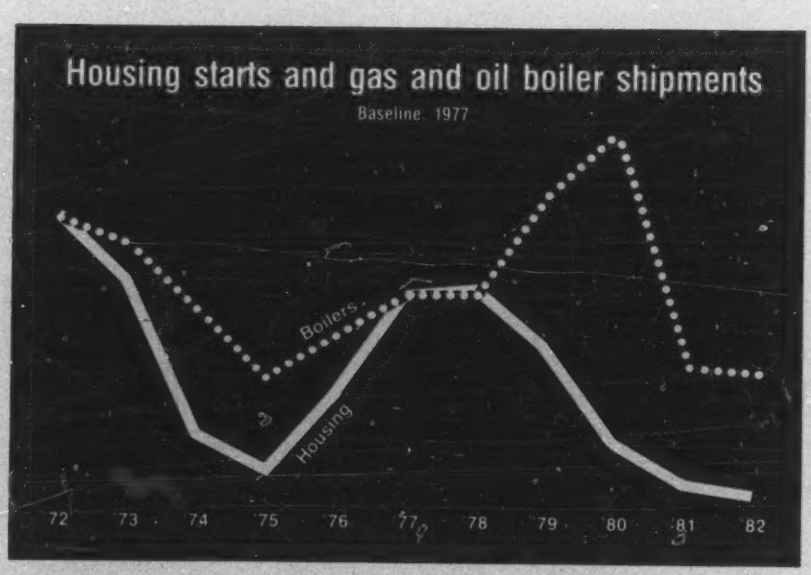


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FROM PAGE 96

vealed 80% of contractors operating in cold climates said they used the fact sheets occasionally or never.

### Housing characteristics

Again this year, The News has been able to obtain from the Bureau of the Census the characteristics of new homes completed during the first nine months of 1982. The accompanying table on page 95 contains both national figures and, because national statistics have an annoying habit of clouding local experience, a regional breakdown as well.

As expected, the report shows a dramatic reduction in the n mber of homes completed, from 624,000 single-family and 324,000 multifamily units completed during the first nine months of 1981 to 442,000 single-family and 269,000 multifamily units in 1982.

Although heating systems remained fairly constant, heat pumps increased from 24.2% of new single-family homes in 1981 to 26.6% last year. Warm air furnaces dropped slightly from 57.1% in 1981 to 53.1% in 1982, hydronic systems increased from 3.1% to 4%, and electronic resistance baseboard and panel systems dropped from 8.6% to 7.7%.

If the census data are accurate, they reflect a continuing shift to heating systems which do not use the three conventional fuels. The "other" category increased from 7% in 1981 to 8.6%, or 40,000 homes, in 1982. Most of these systems are located in the South and West.

Fuel use changed very little in 1982, with natural gas claiming a 40.4% share, electricity 50.2%, oil 2.7%, and "other" fuels 6.3%.

The penetration of central air conditioning, at 66.5% in 1982, up from 64.3% a year earlier, was helped by the fact that more than half of the completed single-family homes were located in the South, where air conditioning penetration was 85.7%. It was only 28.3% in the Northeast.

Air conditioning penetration in multifamily units completed in 1982 was 88.4%. Again, 97.3% of multifamily units in the South were air conditioned as were 69.5% of those in the Northeast.

In a previously unpublished Bureau of the Census study, it was revealed that, in 1979, heat pumps were used in 24.8% of the 386,000 electrically heated multifamily units completed that year. In 1980, heat pumps were used in 27.7% of electrically heated multifamily units.

The same study also revealed that, of the 476,000 air conditioned multifamily units completed in 1979, room air conditioners were used for 16.8%, a central system serving the entire building was used for 7.6%, and 75.6% were served by central systems in each apartment. For 1980, the percentages for the 460,000 units completed were: room units 12.2%; building central systems 7.8%; and apartment central systems 80%.

It might be noted, too, that heat pumps continue to be largely a southern and western phenomenon. In 1980 the South's share of the heat pump market was 65%, and last year it was 70%. The West has held steady at 20% for the last three years.

### Fuel costs

A two-year tally of fuel prices compiled by the Department of Labor as part of the cost-of-living index shows that, from December, 1981, to December, 1982, fuel oil prices dropped 1.5% from $1.247/gal to $1.229/gal. Since that time, oil prices have declined to about $1.14/gal, or an 8% drop.

During the same period, natural gas prices increased by 27.5% from $46.369 per 100 therms to $59.156 ($72.951 in the Northeast, $48.55 in the West), and 500 kWh of electricity increased by 6% from $34.96 to $37.074 ($45.667 in the Northeast, $32.321 in the West).

### Conversions

The uneven escalation of fuel prices over the past decade has led to sharp increases for a short period for some equipment and corresponding decreases for other equipment that had little to do with construction or the economy.

Following the Arab oil embargo of 1973, there was a mass shift away from electric resistance heating, particularly in the Northeast, as electricity prices skyrocketed and special all-electric rates disappeared. Although there were some conversions away from oil, it was not until 1978 when natural gas, which had been severely curtailed for nearly a decade, again became widely available that the dam broke.

Conversions to natural gas from other fuels amounted to only 89,000 in 1977. They grew to 365,000 in 1979 and to 383,000 in 1980, creating a severe shortage of conversion burners. The principal victim was oil. Conversions in 1982 were estimated by the Gas Appliance Manufacturers Association (GAMA) at 200,000, but we suspect conversions to gas last year were closer to the 1977 level.

Prime reasons for the slowdown in gas conversions were the still-high price escalation rate of gas while prices of competitive fuels were stable or falling, the threat of eliminating federal price controls on gas before 1985, and the fact that most of the easy conversions had been made.

Conversions to oil from other fuels continued steady at 11,000 last year. They had amounted to 50,000 for many years. Electric heat has never fared well in the conversion market as a predator of other fuels, although an increasing number of worn out split-system cooling units are being replaced by heat pumps to provide better economy, in connection with companion oil, natural gas, and LP gas furnaces, in the shoulder seasons.

**Each Statistical Panorama includes the latest data available. Sources frequently revise their previous year's figures, which explains apparent discrepancies between the latest and earlier published data. Where sources give significantly varying information, that data is mentioned.**

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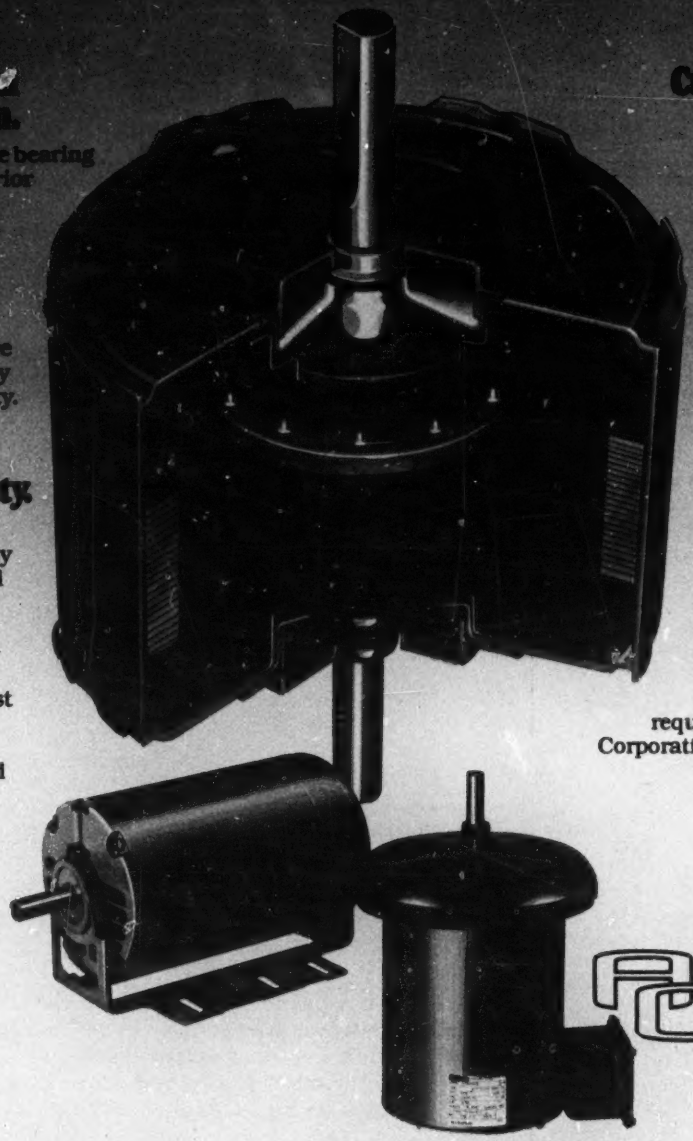

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# Housing and construction

Although private housing starts in 1982, at 1,060,600 units, fell to their lowest level since 1946, the housing industry is building to a dramatic 36% surge this year that, according to the industry's chief economist, will be sustainable for at least two more years.

The keys to the recovery, which started to build late last year, are monetary policy and interest rates.

When the Federal Reserve Board, which brought on the three-year recession in housing, decided to release its choking grip on the money supply in October, 1982, interest rates declined, the stock market rallied, and a demand for shelter pent up for the longest period since the Depression showed immediate signs of breaking loose.

Mortgage rates took a sharp drop from a range of 15% to 17% in July, 1982, to 11.5% for government-insured mortgages and 12% to 13% for conventional loans. They could drop a bit lower as falling oil prices influence investors to lower their expectations about inflation and the precipitous drop in business borrowings channels more money into mortgages while returns still are high.

Speaking in Troy, Mich., Michael Sumichrast, chief economist of the National Association of Home Builders (NAHB), forecast that home builders will have three good years, almost as good as those of 1976 through 1979. "I believe now that the period 1983 through 1985 looks much better than I would have thought possible a couple of months ago."

The biggest cloud on the horizon is a burgeoning federal deficit which could soar to $200 billion and compete strongly for available investment funds. But with the revitalization of the nation's thrift institutions as a major factor in the mortgage market, continued support from commercial banks, substantial participation by pension funds, and a lack of competition from the industrial sector, ample mortgage funds appear to be assured.

### 1982 experience

Private housing starts, which slid to about half of the 1978 level by 1981, declined by 2.2% last year to 1,060,600 units. The total for the previous year was a dismal 1,084,200 units. Both figures represent the worst housing industry performance since 1946.

Single-family housing starts in 1982 totaled 661,000 units, down 6.3% from the previous year's total of 705,400 units. Last year's performance represented a 53% decline from the number of starts recorded as late as 1978, the year when the Federal Reserve Board put strong clamps on credit and sent mortgage interest rates into the stratosphere.

Multifamily housing units fared a bit better last year. Total starts, at 399,600 units, increased by 5.5% over the total of 378,800 units started in 1981. Multifamily starts in 1978 totaled 587,000 units.

Geographically, housing starts declined in 1982 in every region of the country except the South, where they increased by 5.5%. Starts declined by 13.9% in the West, by 10.3% in the North Central region, and by 1.7% in the Northeast.

### 1983 forecast

Unlike last year, when President Ronald Reagan vetoed a bill that would have given some measure of relief to the housing industry — and so destroyed our forecast along with those of many others — we feel much more confident gazing into this year's crystal ball.

With mortgage rates still heading downward and three years of pent-up demand as a driving force, we feel that only a shortage of materials will prevent housing starts in 1983 from reaching a total of 1,450,000 units. That represents 389,400 more units than last year, or an increase of 36.7%.

Single-family housing starts, held down to Depression levels by the inability of prospective buyers to finance them or sell their present homes, should increase by a dramatic 43.7% this year to 950,000 units. That would be 289,000 more single-family homes than last year.

Multifamily homes, on the other hand, should increase by only 25% this year to 500,000 units. That's still 100,400 more homes than last year, but the smaller increase, is a reflection of the continuing specter of rent controls and the declining attractiveness of large, multifamily projects as tax shelters.

It might be pointed out, too, that the forecasts for both single-family and multifamily starts in 1983 still are substantially under the last boom year of 1978 when total housing starts amounted to 2,020,300 units.

If the forecast of at least two more good years proves correct, we feel that housing starts will range in the area of 1.5 million to 1.8 million total starts. It must be remembered that housing so far is the only bright spot in the construction industry — and one of the very few bright spots in a still-sluggish national economy.

The first order of business is to sell off the existing inventory. Builders have been using many strategies to lure prospective buyers, including buying down interest rates and providing graduated payment schedules to allow buyers to qualify more easily or to allow them to get into a better home.

Early reports indicate that it has been these subsidies that helped initiate the post-October surge in home buying. They are expected to disappear as mortgage rates become more reasonable. Builders continue to maintain that 12% is the magic number for conventional mortgages.

The unsold inventory of single-family homes, which has been dropping for three years, was down to 243,000 units in November. 1982, the lowest number since July, 1971. The time needed to sell this inventory fell to only 5.2 months, or about half of the 10-month supply of a year earlier.

NAHB reported that builders have noted increased traffic through subdivisions and even some shortages as the first waves of prospective buyers snap up available homes. FHA applications for mortgage insurance have increased fivefold.

The National Association of Realtors reported that sales of existing single-family homes began to accelerate in November and December, 1982, to a rate of more than 2 million homes annually. The total for the year, however, was only

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FROM PRECEDING PAGE

1,939,000 units, the lowest since the 1,612,000 units recorded in 1970.

Once again the South led the nation in housing starts last year with 54% of the total, up from 52% in 1981. Next came the West with 19%, the North Central states with 15%, and the Northeast with 12%. The South will lead again this year, but already there are stirrings in the Northeast and North Central states. California, particularly in the south, also expects to do well.

Houston, too, continued to lead the nation in housing starts with 66,100 last year, but the bloom may fade a bit in 1983 when the total sinks to a still-notable 55,500 starts. Dallas took second place last year with 45,500 starts and should do better in 1983 with 51,300 starts, according to NAHB projections.

The 1982 records of other leaders, with 1983 projections in brackets, follows: Atlanta, Ga. 22,200 (24,600); Phoenix, Ariz. 21,300 (30,000); Washington 15,100 (17,500); Denver, Colo. 14,900 (16,000); Tampa, Fla. 13,100 (18,700); Austin, Texas 12,400 (14,200); San Antonio, Texas 12,200 (11,500); Los Angeles 11,500 (13,000); New York 11,200 (12,700); Minneapolis, Minn. 10,900 (11,900); Orlando, Fla. 10,300 (12,400); Riverside-San Bernadino, Calif. 10,000 (10,500); and Chicago 9,900 (11,500).

### Pressure continues

New households were formed at a record pace of almost 1.7 million per year in the 1970's, according to the 1980 Census, far outstripping the 1.06 million annual average of the 1960's. With some 41 million Americans expected to reach the prime home-buying age of 30 and another 15 million graduating from college, household formations are expected to average almost 1.4 million per year in the 1980's.

In 1980, the Census Bureau counted 80.3 million households, up 23% from the 63.4 million counted in 1970. Population, on the other hand, increased by only 11% from 203.3 million to 225.5 million. This confirmed a long-noted trend toward more one- and two-person households. Household size declined sharply from 3.11 persons in 1970 to 2.75 persons in 1980.

NAHB estimates that the demand for new homes will average 1.6 million units annually throughout the 1980's.

Also documented was the shift to the Sunbelt states, with the largest increases in households occurring in California (2.06 million), Texas (1.49 million), and Florida (1.46 million) from 1970 to 1980. These three states account for 17.3 million households, almost as many as the entire Northeast.

A study of 14,000 home buyers conducted in 1981 by the U.S. League of Savings Associations showed that the number of first-time buyers had declined sharply to 13.7% from 17% in 1979 and 36% in 1977. Other findings:

- Unmarried home buyers accounted for 40.5% of home sales in 1981, up from 30.7% in 1979.
- Almost 30% of home buyers were single, up from 22.4% in 1979 and 17% in 1977.
- More than 57% of homes bought in 1981 went to small households with only one or two members, up from 52% in 1979.
- Half of all conventional mortgages in 1981 were either renegotiable or adjustable-rate loans. Conventional fixed-rate mortgages accounted for 27.3% of the market. Combinations of existing mortgages with additional funding and builder buydowns accounted for 21.8%.
- The proportion of home buyers purchasing condominiums doubled from 11% in 1979 to 21.5% in 1981.

### Prices

The median price of a new home, which has escalated by 154% between 1972 and 1982, was estimated by NAHB at $70,000 in 1982, just $1,100 more than in the previous year. Actual prices, however, were somewhat lower because builders bought down many mortgages or used other methods of creative financing to sell off inventories.

The median price of an existing home, which also escalated by 154% between 1972 and 1982, was $67,800 in 1982, according to the National Association of Realtors. This represents an increase of 2.1% over the $65,800 median price a year earlier.

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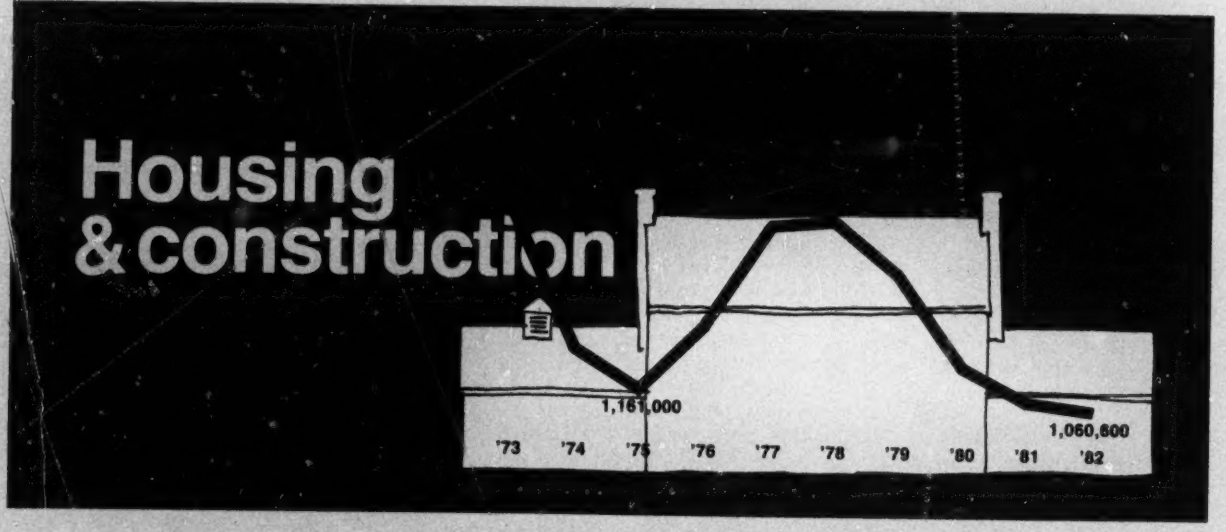

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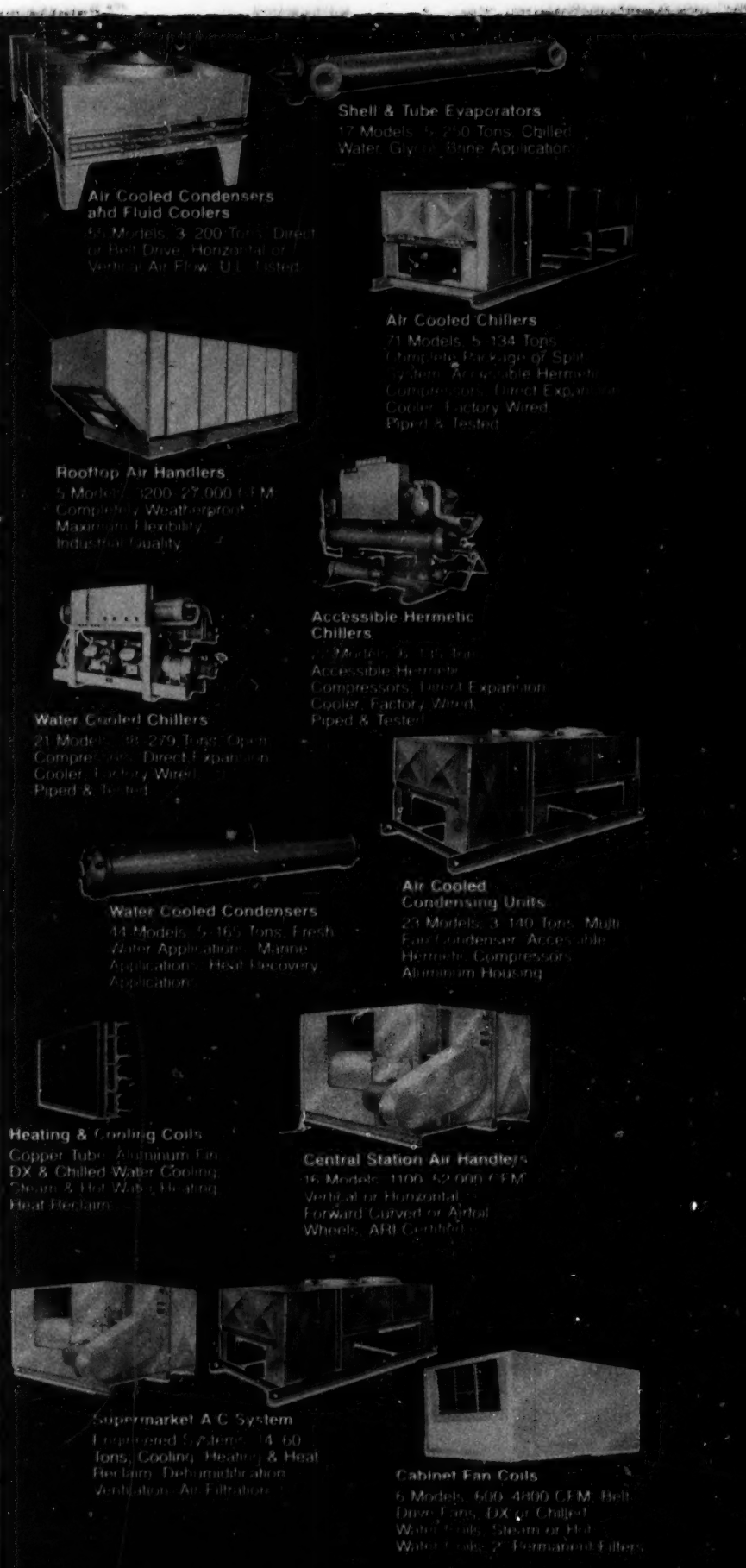
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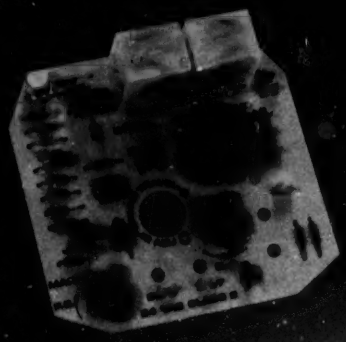

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FROM PAGE 102

The median-priced new home sold for $100,400 in the West; $66,300 in the South; $65,800 in the Northeast; and $56,200 in the North Central states.

### Money markets

Indications are that the mortgage market now is responding, and will continue to respond, to the upturn in demand for new mortgages, primarily because other private credit demands are expected to remain weak for at least one year and, possibly, two years.

For example, the Federal Home Loan Mortgage Corp. reported that the demand for mortgages in the secondary market in the last two months of 1982 was more than the total for the first nine months of the year, and higher than the record level set in 1978.

In the primary market, savings and loan associations (S&L's) and mutual savings banks have traditionally originated more than half of all one- to four-family home mortgages and two-thirds of all mortgage activity. This share fell in 1982 to 42.7% of one- to four-family mortgages and half of all mortgage activity, probably close to its future level.

Savings and loan associations, aided by the new money market consumer accounts, in December and January attracted new deposits at an annual growth rate of 25%. Although this rate probably cannot be sustained, S&L's are flush again and ready to provide mortgages.

The problem is that they prefer adjustable rates, which borrowers generally reject if there is another alternative. It remains to be seen whether S&L's will go back to fixed-rate mortgages or use the funds to pay off their substantial debt.

In 1976, mortgage bankers handled 14% of all mortgage originations, mostly confined to VA and FHA loans. But in the first nine months of 1982, they handled 17% of conventional mortgage originations and almost 30% of all activity, a trend that is expected to grow.

Commercial banks, which originated more than 20% of all mortgages in the 1970's, have been originating a steady 25% of conventional one- to four-family mortgages over the past five years and are expected to continue.

Another trend is the entry of finance companies, credit corporations, and credit unions into the primary mortgage market. Whether this trend continues will depend on their access to secondary markets.

It is significant that, in the expanding secondary mortgage market that allows individual institutions to grant mortgages in excess of their own assets, pension funds have become second only to S&L's as holders of mortgage participation certificates.

Perhaps most interesting among future developments will be what will happen to the 100 or so mortgage variations that have sprung up since the credit crackdown of 1978. A shakeout is inevitable, especially because of the influence of the secondary mortgage market. The question is what few will survive.

### Multifamily

Multifamily construction, which continued strong last year when compared to single-family home starts, will not be able to maintain that ratio in 1983. Even so, multifamily starts should increase by 100,400 units, or 25%, to 500,000 units this year.

There is no doubt about demand. Even with the recession, the vacancy rate rose to only 5.3% last year, much less than that in the major cities.

The major problem is that rents of existing apartments are too low to cover today's cost of construction in many areas, especially in areas where there are rent controls or a threat of rent controls. The market has become so competitive that even tax-sheltered partnerships are going under because of a lack of cash flow and so are becoming less attractive to investors.

This explains, in large measure, why nonsubsidized rental unit starts as a percentage of the multifamily total dropped from 65% in 1975 to 29% in 1981 and 26% in 1982. In units, the 1982 nonsubsidized rental starts totaled 107,900 units, down 8.6% from the 118,000 units started in 1981.

Condominiums, on the other hand, have been increasing steadily. The Bureau of the Census reported that 11% of single-family homes built in 1981 were townhouses and that 14% of units in structures with five units or more were townhouse apartments. Of the slightly more than half of all housing units built in 1981 for sale, almost 31% were intended for condominium ownership.

In 1982, NAHB reported there were 140,000 condominium units started in buildings with five or more units, up 15.7% from the previous year's total of 121,000 units and nearly triple that 38,000 condominiums started in 1976.

### Mobile homes

Shipments of mobile or manufactured homes in 1982 totaled 238,800 units, less than 1% lower than the 240,700 units shipped in the previous year. The continued strength of these site-delivered homes, popular with retired people and those with moderate incomes, came despite the recession and high interest and unemployment rates.

Although not counted in the official housing statistics, shipments of these homes amounted to 36% of all private single-family site-built homes started in 1982 — up from 34% in 1981 — and 22.5% of all site-built homes.

A bonus for the manufactured home industry came with the March announcement that the Department of Housing and Urban Development has determined manufactured homes now are eligible for long-term financing under Title II of the National Housing Act.

The program allows purchasers of manufactured homes to qualify under Section 203 (b) of the act to secure 30-year FHA-insured loans with limits ranging from $67,500 to $90,000. FHA will insure 97% of the first $25,000 and 95% of the remainder.

The Manufactured Housing Institute reports that zoning policies that confine many of these homes to special areas are being changed, as is the classification of these homes as real property instead of as chattels.

The average 1982 price of a new manufactured home was $19,500. The price includes transportation, set-up, furnishings, appliances, and a one-year warranty. Land is not included in the price.

The top markets for these homes in 1982 included: Texas 43,800 units; Florida 24,100; North Carolina 14,500; Louisiana 14,200; Oklahoma 12,200; and Georgia 12,200.

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# Labor

As the construction industry moves into the heaviest round of bargaining since the expiration of wage controls in the mid-1970's, high unemployment rates and dim prospects for improvement in 1983 have taken the steam out of the upward pressure by labor for large increases in wages and fringes.

In fact, a four-year trend of accelerating wage settlement rates was broken in 1982 with a significant drop in newly negotiated increases, according to the Construction Labor Research Council (CLRC).

For all construction trades in 1982, the average first-year increase was $1.10 an hour, or 6.7%, and the average second-year increase in multiyear contracts was $1.17, or 6.6%. In contrast, the average first-year increase in 1981 was $1.82, or 12%, and the average second-year increase was $1.71, or 10%.

Front-end loading of multiyear contracts all but disappeared in the 1982 bargaining season. In fact, 9% of contracts negotiated last year contained wage freezes, and management made significant progress in eliminating restrictive work rules, including the replacement of double and triple time provisions with time and a half. Many other contracts now contain the option of working 10 straight time hours for four days in the week.

The heavy bargaining in 1983 is a consequence of the abnormally large number of one-year agreements negotiated in the previous year. In recent years, about 45% to 50% of all construction contracts have expired each year, but in 1983 this proportion will expand to 60%. Agreements covering almost 900,000 workers will be negotiated, according to CLRC.

More than half of all agreements will be expiring in each region with the exception of the Middle Atlantic, but even there a number of major cities, including Philadelphia, will be negotiating. The four-state cluster of Illinois, Missouri, Iowa, and Wisconsin will account for more than a quarter of all negotiations.

Scheduled wage and fringe increases contained in the more than 900 multiyear contracts negotiated in prior years show an average increase for 1983 of $1.38, or 7.5%. For 1984, the average increase is $1.42, or 7.2%. Average dollar increases for six of the eight regions in 1983 are clustered between $1.23 and $1.47, CLRC reported.

The biggest problem facing the industry is unemployment, which CLRC reports was 93% higher than the average for all industries over the past decade. In no year during the past 10 has the differential been less than 77%. The unemployment rate in 1983 was no lower than 17.9% and finished the year with only 3.85 million workers employed, the lowest level since 1977.

The average increase in wage and fringe rates for construction workers during the past five years was $6.21, bringing the average hourly rate to $18.62 on Jan. 1, 1983. This represents an increase of 50%. The largest dollar increases were recorded for electricians, elevator constructors, and United Association (UA) pipefitters. Of the skilled trades, plasterers had the lowest dollar increase and crane operators the lowest percentage increase.

### Crafts

The average wages-plus-fringes rate for UA pipefitters and pipefitter-plumber combined locals in the U.S. on Jan. 1, 1978, was $13.71/hour. By Jan. 1, 1983, that average rate had increased by $7.03/hour, or 50.5%, according to figures supplied by CLRC.

The lowest increase was $5.57/hour (to a 1983 rate of $17.34/hour) in the Southeast. The highest were $9.71/hour (to $26.66/hour) in the Southwest Pacific region and $8.31/hour (to $24.73/hour) in the Pacific Northwest.

UA plumber-only locals averaged $12.88/hour on Jan. 1, 1978, and on Jan. 1, 1983, the wages-plus-fringes package had increased by 59.7% to $20.58/hour.

Members of the Sheet Metal Workers' International Association (SMWIA) received a national average of $13.34/hour on Jan. 1, 1977. By Jan. 1, 1983, the wages-plus-fringes package had increased by $6.96/hour, or 52.2%, to $20.31/hour.

The lowest increases for sheet metal workers were the $5.24/hour received by locals in the Southeast (to $16.58/hour last January) and the $5.68/hour (to $18.48/hour) for locals in the West North Central region. The highest increases were the $9.84/hour (to $25.80/hour) in the Southwest Pacific region and the $9.66/hour (to $23.66/hour) in the Northwest.

Meanwhile, surveys conducted by the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) and the Mechanical Contractors Association of America (MCAA) in 1982 revealed a continuous erosion of unionized construction contracts in favor of open shops.

A major topic of the 1983 negotiating season for union contractors and both the UA and SMWIA will be provisions designed to make union contractors more competitive in an already depressed market.

**Each Statistical Panorama includes the latest data available. Sources frequently revise their previous year's figures, which explains apparent discrepancies between the latest and earlier published data. Where sources give significantly varying information, that data is mentioned.**

# International

The air conditioning and refrigeration industry, a longtime contributor to the nation's positive balance of trade, suffered a minor setback in world markets in 1982 when exports declined and imports increased. When the dust had settled, however, the industry's positive trade balance stood at a still-healthy $1.5 billion.

The total value of exports, according to the Department of Commerce, was $1.802 billion in 1982, or 13% less than the $2.073 billion recorded in the previous year. At the same time, there was a 5.8% increase in the value of air conditioning and refrigeration equipment imported into the United States. Imports in 1982 totaled $289.6 million, up from $273.8 million in the previous year.

The difference in scale is readily apparent. Imports still represented only 16% of exports last year, up from 13.2% in 1981.

The positive balance of trade generated by air conditioning and refrigeration equipment amounted to $1.51 billion in 1982, down 16% from the $1.8 billion balance in 1981. This represents only shipments and does not take into account the profits to U.S. companies from subsidiaries, joint ventures, and licensing agreements which are not reinvested abroad.

The outlook for 1983 is for relatively stable market conditions abroad and, possibly, even a bit of an upturn in Europe and in the Far East. The continued influx of foreign compressors, particularly those from Japan, will continue to increase imports and whittle away at the positive trade balance.

### Imports

According to Department of Commerce figures, four nations accounted for $234 million of the $289.6 million worth of air conditioning and refrigeration equipment imported into the United States last year. The four:

- **$133.5 million from Japan,** down 4% from 1981, which mostly included 800,000 automotive air conditioning compressors; 210,000 compressors of less than 0.25 hp; 78,000 compressors of from 0.25 hp to 10 hp; 8,100 ammonia compressors; 365 screw compressors; and 44,500 unitary air conditioners.
- **$50.8 million from Canada,** up 15.8% from 1981, which mostly included 85,000 compressors of less than 0.25 hp; 31,000 room air conditioners; 25,000 unitary air conditioners; 2,800 refrigerators; and 24,000 freezers.
- **$29.5 million from Italy,** up 9.3%, which mostly included 278,000 compressors of less than 0.25 hp; 149,000 compressors of from 0.25 to 1 hp; 65 screw compressors; 1,800 refrigerators; and 51,000 freezers.
- **$20.7 million from Singapore,** down 10% from 1981, which mostly included 467,000 compressors of less than 1 hp and 7,200 compressors of from 0.25 hp to 1 hp.

Of the remainder, the U.S. imported 126,000 compressors of less than 0.25 hp from Brazil; 9,000 unitary air conditioners from Hong Kong; 16,000 refrigerators from Sweden; 4,000 freezers from Yugoslavia; 268 screw compressors and 42,000 compressors of less than 1 hp from West Germany.

In all, the U.S. imported $136.5 million worth of compressors in 1982, down 5.7% from the $144.8 million in the previous year. The total for last year was 1.3 million compressors imported into the U.S.

### Top markets

In terms of products exported, the Commerce Department's Bureau of the Census prepares country-by-country breakdowns for most of the product categories listed in the 10-year look at U.S. industry shipments found elsewhere in this issue. In most cases, it lists the number of units shipped and their total dollar value.

Although we do not have the space to reprint the complete breakdown, a feel for the top export markets in 1982 can be gained by looking at the top customer countries for key products expressed in numbers of units. Here are a few:

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## Major export markets

### U.S. air conditioning, refrigeration equipment (values in millions)

| Market | — 1978 — | | — 1979 — | | — 1980 — | | — 1981 — | | — 1982 — | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Value | % of total | Value | % of total | Value | % of total | Value | % of total | Value | % of total |
| Canada | 298 | 21 | 307 | 19 | 310 | 17 | 401 | 19 | 352 | 19 |
| Central, South America | 170 | 12 | 242 | 15 | 262 | 14 | 363 | 18 | 285 | 16 |
| Western Europe | 198 | 14 | 242 | 15 | 320 | 16 | 315 | 15 | 323 | 18 |
| Far East | 184 | 13 | 242 | 15 | 289 | 16 | 314 | 15 | 297 | 16 |
| Middle East | 397 | 28 | 404 | 25 | 457 | 25 | 506 | 24 | 445 | 25 |
| Africa | 85 | 6 | 81 | 5 | 117 | 6 | 164 | 8 | 98 | 5 |
| Other | 85 | 6 | 97 | 6 | 108 | 6 | 10 | 1 | 1 | 1 |
| Total | 1,417 | 100 | 1,615 | 100 | 1,863 | 100 | 2,073 | 100 | 1,802 | 100 |

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*R-values determined from thermal conductivity tested at 75°F per ASTM C-177.

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• **Auto and truck refrigeration** and air conditioning compressors (246,000 units total): West Germany 121,000; Canada 66,700; Venezuela 17,200; United Kingdom 16,600; and Australia 8,000.

• **Compressors of 3 hp and less** (659,000 units total): Canada 107,000; Saudi Arabia 131,000; Mexico 70,000; Brazil 36,000; Japan 57,000; Thailand 28,000; Nigeria 27,000; and Venezuela 24,000.

• **Compressors of 3 hp to 10 hp** (383,000 units total): Canada 308,700; Venezuela 12,000; Belgium 12,000; Thailand 5,000; Kuwait 5,000; Hong Kong 4,000; and France 3,000.

• **Compressors of more than 10 hp** (38,800 units total): Canada 7,000; France 3,200; Australia 2,600; Belgium 2,500; United Kingdom 2,600; Saudi Arabia 2,200.

• **Ammonia compressors** (2,445 units total): Mexico 620; Canada 550; Nicaragua 510; and Colombia 130.

• **Room air conditioners** (480,100 units total): Saudi Arabia 255,000; Hong Kong 29,500; Arab Emirates 19,600; Kuwait 20,900; Venezuela 14,300; Nigeria 11,100; Canada 8,600; West Germany 8,600; Lebanon 5,700; and Colombia 4,400.

• **Self-contained heat pumps** (24,000 units total): Canada 8,800; Australia 4,000; Venezuela 1,700.

• **Split-system heat pumps** (18,700 units total): Canada 5,500; Saudi Arabia 2,800; Australia 1,900; Spain 1,400; and Lebanon 1,000.

• **Unitary heating-cooling single packages** ($36.2 million total value): Saudi Arabia $10.7 million; Canada $6.6 million; Mexico $2.5 million; Netherlands $1.5 million; and Venezuela $2 million.

• **Self-contained air conditioners 5 tons and under** (40,000 units total): Saudi Arabia 6,200; Canada 5,200; Hong Kong 4,400; Kuwait 3,700; Venezuela 3,300; and Lebanon 1,900.

• **Self-contained air conditioners over 5 tons** (17,400 units total): Canada 3,200; Kuwait 2,800; Saudi Arabia 1,700; and Venezuela 1,100.

• **Air conditioning condensing units 5 tons and under** (59,700 units total): Saudi Arabia 13,000; Lebanon 5,200; Canada 4,500; Egypt 4,300; Colombia 3,600; Hong Kong 2,700; Venezuela 2,400; Kuwait 1,600; and Arab Emirates 1,800.

• **Air conditioning condensing units over 5 tons** (8,800 units total): Saudi Arabia 1,400; Venezuela 1,400; Kuwait 1,200; and Canada 750.

• **Room fancoil units** (47,200 units total): Saudi Arabia 7,000; Canada 6,200; Kuwait 2,700; Hong Kong 2,700; Venezuela 2,500; Australia 2,400; France 1,500; Uruguay 1,500; Arab Emirates 1,400; Egypt 1,300; and Taiwan 1,300.

• **Central station air handlers** (12,000 units total): Saudi Arabia 4,500; Hong Kong 900; Venezuela 600; Canada 500; United Kingdom 500; Thailand 500; and Kuwait 400.

• **Centrifugal liquid chillers** (1,157 units total, 205 open and 952 hermetic): Hong Kong 190; Canada 174; Saudi Arabia 98; Taiwan 80; Singapore 71; France 46; United Kingdom 36; and Japan 124.

• **Absorption chillers** (122 units total): Canada 30; West Germany 15; Pakistan 14; Leeward Islands 12; Saudi Arabia 20; and Taiwan 29.

• **Reciprocating liquid chilling packages** (2,300 units total): Saudi Arabia 430; Canada 340; Kuwait 240; Arab Emirates 170; Egypt 100; Venezuela 100; Ecuador 90; and Hong Kong 80.

• Of the $288 million worth of **air conditioning and refrigeration parts** —down 45% from the $523 million worth exported in 1981 — Saudi Arabia accounted for $69 million; Canada $21 million; France $19 million; Nigeria $11 million; and Kuwait $9.5 million. It does not include $2.1 million in vitreous enameled parts for refrigerators; $31.6 million in parts for household refrigerators and refrigerator-freezers; and $37 million in refrigeration parts.

• **Ice-making machines** (22,500 units total): Canada 13,300; Venezuela 1,600; United Kingdom 1,200; Colombia 1,000; France 900; and Italy 650.

• **Drinking water coolers** (69,000 units total); Saudi Arabia 32,000; Canada 9,500; Kuwait 3,000; United Kingdom 2,000; Venezuela 2,000; Hong Kong 1,600; and Indonesia 1,500.

• **Soda fountain and beer-dispensing equipment** (14,600 units total): Colombia 5,100; Saudi Arabia 1,400; Singapore 1,100; and Canada 1,100.

• **Refrigeration condensing units** (5,600 units total): Canada 3,500; Singapore 625; Hong Kong 200.

# Wholesalers

Air conditioning and refrigeration parts-and-supplies wholesalers feel that business in 1983 will be about the same, or a little better, than in 1982, according to a forecast by members of the Air-conditioning and Refrigeration Wholesalers (ARW).

ARW wholesalers feel 1983 sales will average about 7.4% more than the previous year. When inflation is figured in, this means it will be the third year in a row that growth has been essentially flat. In 1983, however, inflation is expected to take a relatively smaller bite.

"While sales projections are somewhat modest compared to past years, the survey as a whole shows a guarded optimism in the midst of a recovering economy and anticipated growth in new construction and in

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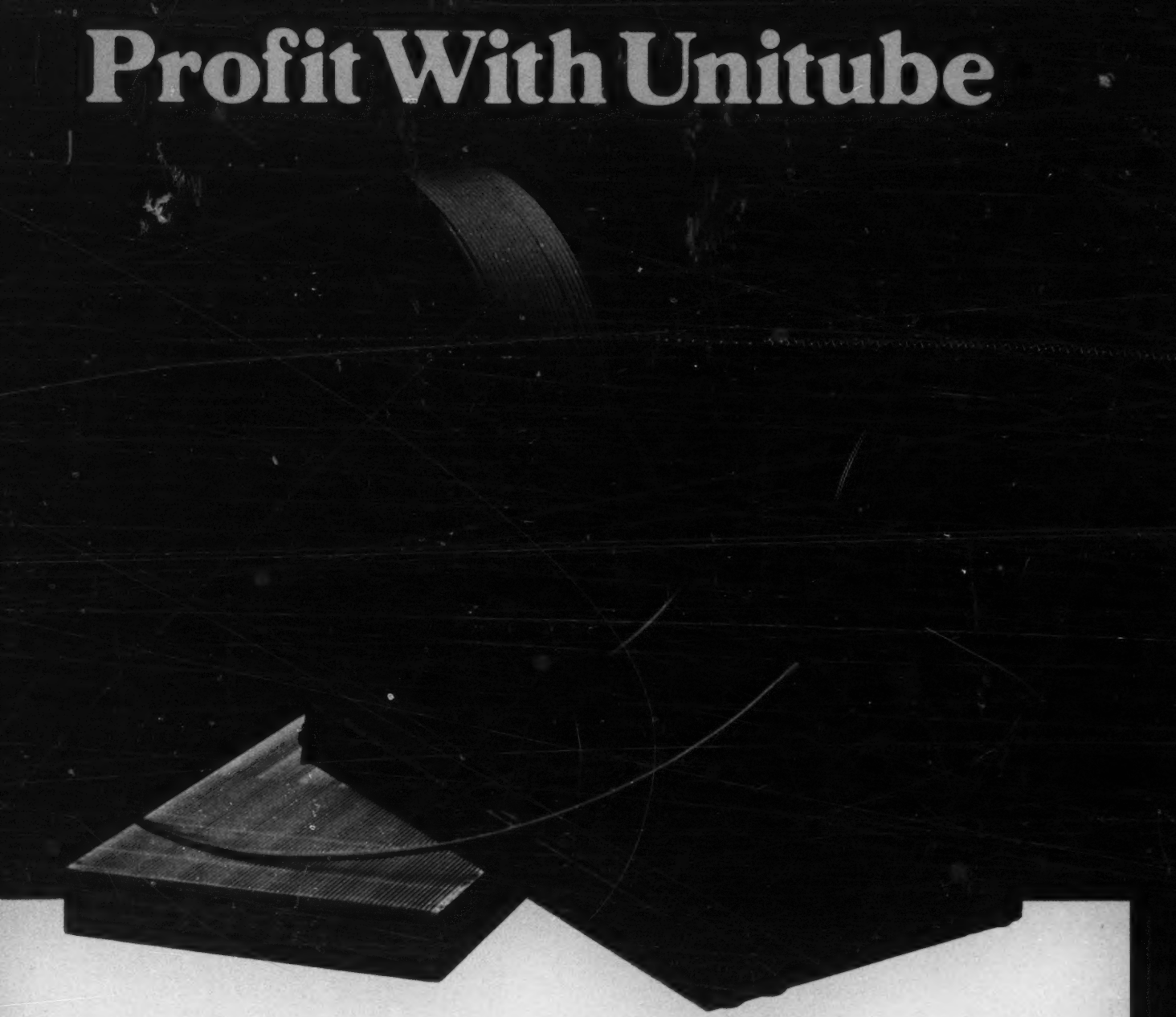
# Profit With Unitube



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AB 2

## Bureau of the Census data

# A 10-year look at air conditioning and refrigeration unit shipments

| Product | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|---|---|
| Condensing units | 391,992 | 501,313 | 474,771 | 334,679 | 417,286 | 529,515 | 537,082 | 497,833 | 455,695 | 439,714 |
| Compressors & compressor units | 16,692,164 | 21,812,788 | 19,134,563 | 19,240,243 | 22,761,950 | 23,991,643 | 25,790,862 | 24,970,111 | 19,829,319 | 21,022,831 |
| Ammonia compressors | 1,564 | 1,725 | 1,714 | 1,449 | 1,453 | 1,443 | 1,819 | 2,014 | 1,860 | 1,808 |
| Screw compressors[1] | — | — | — | — | — | — | — | — | 5,809 | 5,320 |
| Fancoil units[2] | 225,017 | 265,699 | 284,267 | 200,807 | 193,587 | 198,939 | 186,827 | 178,719 | 245,127 | 253,832 |
| Induction units[3] | 92,631 | 48,341 | 38,422 | 42,636 | 21,112 | — | — | — | 33,343 | — |
| Central-station air handlers | 58,630 | 51,260 | 53,621 | 47,691 | 48,616 | 52,371 | 52,441 | 60,266 | 60,841 | 59,866 |
| Unitary air conditioners[4] | 2,140,504 | 2,726,269 | 2,392,193 | 1,561,385 | 2,399,638 | 2,829,447 | 3,226,998 | 3,057,009 | 1,881,465 | 1,997,027 |
| Unitary heat pumps (air-to-air) | 80,937 | 104,267 | 119,983 | 160,485 | 320,043 | 536,558 | 371,436 | 646,926 | 508,457 | 611,050 |
| Water-source heat pumps | — | — | — | — | — | — | — | — | 69,931 | 69,689 |
| Packaged terminal air conditioners | 204,785 | 294,198 | 268,253 | 189,927 | 182,608 | 261,777 | 148,332 | 183,274 | 143,212 | 149,061 |
| Packaged terminal heat pumps[1] | — | — | — | — | — | — | — | — | — | 32,439 |
| Room air conditioners | 3,923,390 | 4,937,384 | 4,244,586 | 2,648,430 | 2,805,124 | 3,303,335 | 4,030,423 | 3,757,102 | 3,178,993 | 3,722,509 |
| Centrifugal chillers[5] | 3,775 | 3,875 | 4,496 | 4,647 | 2,994 | 2,977 | 2,975 | 3,141 | 4,200 | 3,938 |
| Reciprocating chillers | 9,258 | 10,126 | 11,130 | 9,279 | 7,114 | 8,665 | 9,003 | 9,695 | 12,325 | 12,525 |
| Absorption chillers | 1,155 | 2,222 | 1,087 | 740 | 571 | 588 | 470 | 392 | 279 | 239 |
| Adsorption, open-type absorption | 2,002 | Combined | — | 1,672 | 1,866 | 2,318 | 2,704 | 2,503 | 2,962 | 3,117 |
| Cooling towers[2] | 14,747 | 14,733 | 13,950 | 13,212 | 11,156 | 8,517 | 9,906 | — | 12,185 | 14,772 |
| Evaporative condensers | 1,928 | 3,276 | 3,112 | 2,764 | 2,094 | 2,299 | 2,453 | 3,263 | 2,881 | 2,859 |
| Mobile vehicle air conditioners | 5,851,080 | 6,462,307 | 6,891,353 | 9,137,453 | 11,978,679 | 9,459,535 | 9,074,932 | 7,651,198 | 5,852,328 | 6,079,517 |
| Mobile air conditioners for trucks, agricultural, construction equipment | 370,015 | 577,361 | 905,993 | 1,412,508 | 2,320,911 | 2,452,820 | 1,298,198 | 1,352,198 | 764,942 | 822,574 |
| Mobile vehicle refrigeration systems[6] | 60,645 | 68,992 | 67,494 | 63,864 | 70,836 | 76,536 | 70,731 | 76,395 | 60,301 | 66,773 |
| Recreational vehicle air conditioners[1] | — | — | — | — | — | — | — | — | 93,919 | 119,566 |
| Unit coolers[7] | 148,623 | 192,766 | 186,312 | 161,287 | 195,738 | 197,975 | 194,905 | 187,434 | 175,371 | 169,484 |
| Ice-making machines | 132,278 | 121,245 | 124,075 | 128,288 | 187,887 | 165,106 | 194,049 | 218,827 | 166,725 | 191,010 |
| Drinking water coolers | 314,524 | 384,745 | 373,723 | 262,173 | 307,570 | 335,173 | 373,885 | 411,687 | 409,782 | 432,733 |
| Dehumidifiers | 439,963 | 730,427 | 645,287 | 525,407 | 502,141 | 351,188 | 477,692 | 728,148 | 734,738 | 540,417 |
| Humidifiers (central and self-contained)[1] | — | — | — | — | — | — | — | — | 423,986 | 394,615 |

Source: Bureau of the Census Current Industrial Reports MA-35M, Air-Conditioning and Refrigeration Equipment, Including Warm Air Furnaces. [1] New category. [2] Excludes vertical stack units for 1977. [3] Withheld to avoid disclosing operations of individual companies. [4] For the years 1980 and 1981, add these figures to those for unitary heat pumps (air-to-air) and subtract exports to get comparable industry figures. [5] Excludes open-type units for 1978 and succeeding years. [6] Excludes railway freight cars for 1974 and succeeding years. [7] Excludes floor-mounted dry and spray types for 1979 and succeeding years.

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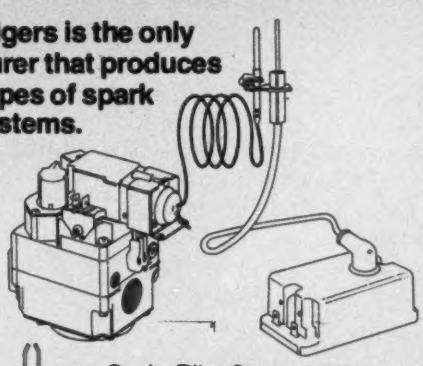

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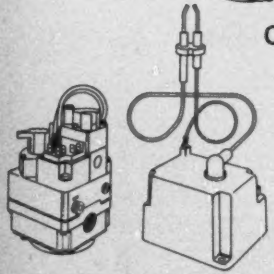

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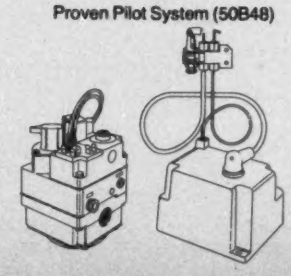

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FROM PAGE 110

the add-on and replacement markets," reported ARW president R. Douglas Marshall, president of R.D. Marshall & Co., Inc., Albany, N.Y.

The greatest percentage gain among product categories in 1983 will come from unitary air conditioning equipment of more than four tons' capacity, at 13.7%, ARW expects, although driers, strainers, fillers, and sight glasses were not far behind at 13%. In both cases, the Southwest expects the biggest increases.

Refrigeration coil sales are expected to increase by 8.9% and replacement compressors, a sales increase leader in recent years, are expected to increase by 8.7%. Here again, the biggest increases will come in the Southwest. The Southwest also expects a 23.4% increase in refrigeration condensing units this year, although the national average increase for this category is a much more modest 7.7%.

The weakest projected change is for sheet metal and fittings, which are expected to decline by 0.9%. For the ARW outlook in chart form, see below.

Canadian sales in 1983 are expected to grow by 4.7%. The sales increase in Canada will be paced by replacement compressors, where an 11.8% increase is expected, and by refrigeration condensing units and by refrigeration coils, where a 9% increase is expected for each category. The weakest projected change in Canada is a 3.2% drop in the

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# Percent of dollar value potential for 1983 vs 1982

| | Northeast | Southeast | Central | Southwest | West | Total | Canada |
|---|---|---|---|---|---|---|---|
| Unitary AC&H equipment (4 tons and under) | –4.4 | 5.4 | 12.7 | 25.0 | 0.4 | 7.7 | 2.2 |
| Unitary AC&H equipment (over 4 tons) | –2.4 | 6.2 | 6.3 | 51.5 | 16.5 | 13.7 | 6.6 |
| Refrigeration condensing units | 2.4 | 6.1 | 7.0 | 23.4 | 4.4 | 7.7 | 9.0 |
| Refrigeration coils | 1.7 | 7.4 | 6.9 | 25.2 | 10.3 | 8.9 | 9.0 |
| Replacement compressors | 4.1 | 6.8 | 12.2 | 15.4 | 3.5 | 8.7 | 11.8 |
| Refrigerant | 4.2 | –0.5 | 7.8 | 1.5 | 5.6 | 4.2 | 2.2 |
| Driers, strainers, filters and sight glasses | 3.1 | 4.4 | 11.7 | 16.0 | 8.5 | 13.0 | 3.4 |
| Refrigerant flow controls – TEV, solenoid, regulating valves, etc. | 3.3 | 7.7 | 10.3 | 6.7 | 9.2 | 7.4 | 2.2 |
| Pressure and temperature controls | 3.2 | 8.9 | 10.5 | 9.4 | 4.2 | 6.0 | 5.4 |
| Electrical controls – relays, contactors and starters | 3.2 | 8.9 | 7.2 | 10.4 | 7.1 | 7.2 | 5.0 |
| Capacitors | 4.0 | 7.1 | 6.1 | 14.1 | 2.7 | 6.8 | 6.2 |
| Electric motors | 1.0 | 5.9 | 7.9 | 12.6 | 6.2 | 6.7 | 7.4 |
| Pipe and tubing fittings | 1.6 | 2.5 | 5.9 | –5.0 | 4.4 | 2.3 | 3.0 |
| Pipe and tubing insulation | 2.0 | 2.2 | 6.3 | 2.4 | 4.4 | 3.7 | 3.0 |
| Grilles, registers, diffusers | 1.4 | 6.0 | 2.5 | –2.0 | – | 2.1 | 2.0 |
| Sheet metal and fittings | – | –4.6 | 1.0 | –3.5 | – | –0.9 | 2.0 |
| Air filters and air cleaners | –0.6 | 4.6 | 7.9 | 4.0 | 7.1 | 3.6 | 3.0 |
| Water treatment and maintenance chemicals | 0.1 | 3.4 | 10.7 | 1.0 | 10.0 | 4.4 | –3.2 |
| Instruments and test equipment | 1.1 | 5.1 | 16.5 | 4.4 | 2.8 | 6.2 | 2.0 |
| **Totals** | **1.5** | **4.9** | **8.3** | **11.6** | **5.6** | **7.4** | **4.7** |

**1983 SALES FORECAST** undertaken by members of the Air-conditioning and Refrigeration Wholesaler (ARW) shows an overall gain of 7.4% in dollar volume over 1982. While a total of 58 firms submitted data for the 1983 forecast, not all indicated their region. Therefore, percentages shown in the "U.S. Total" column do not equal the average of all region data combined. Rather, the "U.S. Total" column represents the average of all respondents, including those who did not indicate their region.

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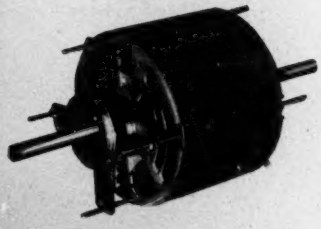

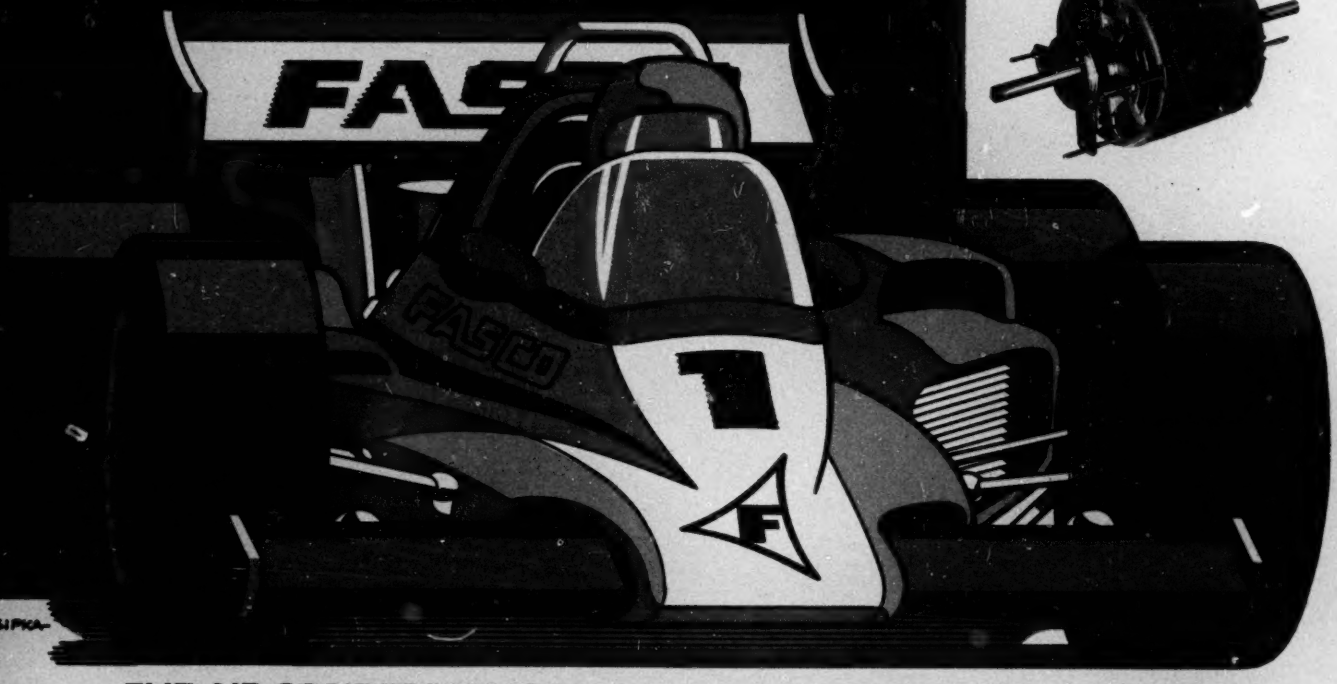


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FROM PAGE 115

sales of water treatment and maintenance chemicals.

The Southwest region — Arkansas, Oklahoma, Texas, and New Mexico — reported the highest expected sales gain of 11.6%. The smallest forecasted gain was reported by the Northeast region — Connecticut, Maine, New Hampshire, Vermont, Massachusetts, New Jersey, New York, and Pennsylvania — at 1.5%. The remaining U.S. regions forecasted gains ranging from 4.9% to 8.3%.

Members of the Northamerican Heating and Airconditioning Wholesalers Association (NHAW) use a three-year forecast, revised each quarter, for five lay product groups — air conditioning, refrigeration, controls, sheet metal, and plumbing (which includes liquid solar systems and hydronic heating).

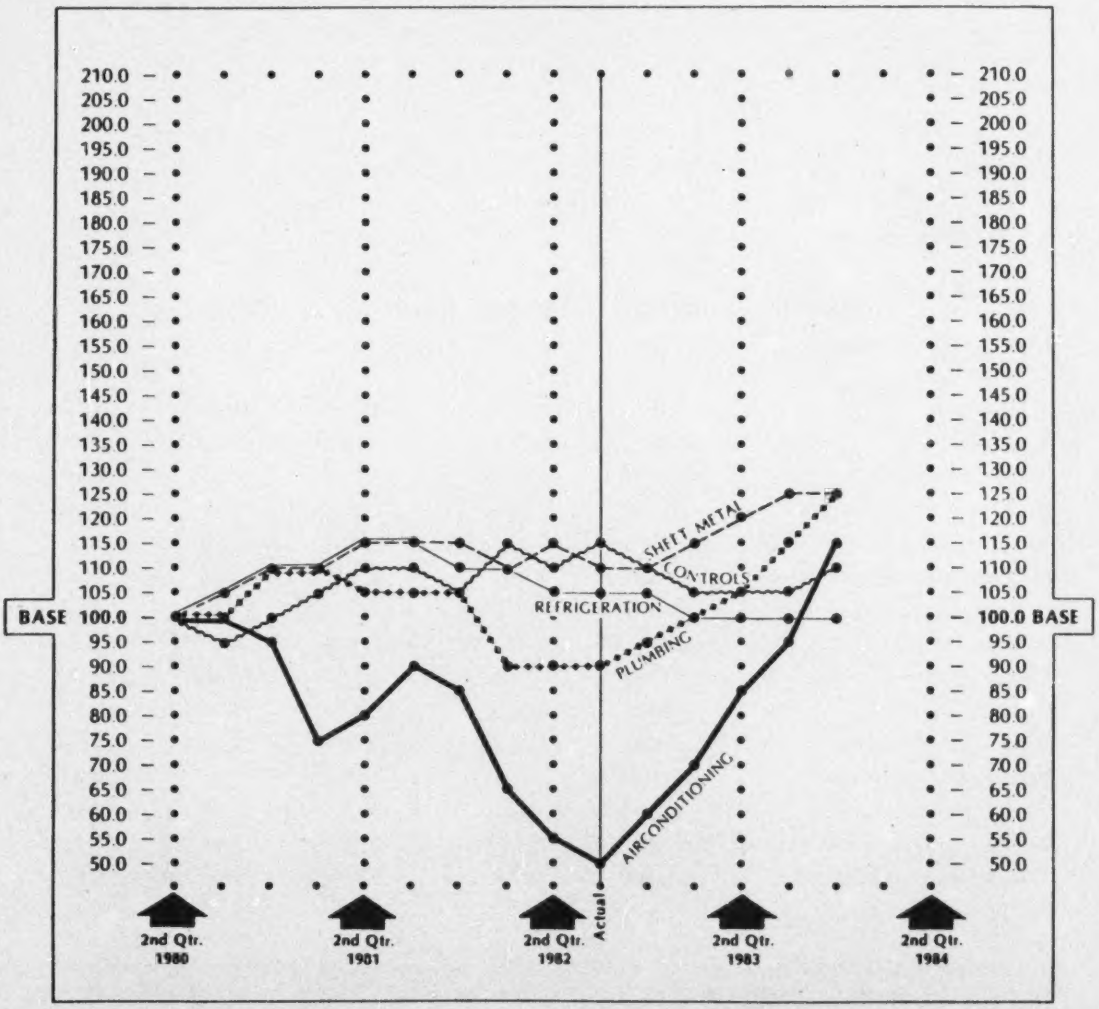
For the NHAW outlook in chart form see below.

The forecast is prepared for NHAW by William Spooner & Associates, Inc., using an econometric model maintained by the University of California — Los Angeles (UCLA) and sales data supplied by NHAW members.

It provides members with forecasts in three modes — one that reflects seasonal fluctuations and unadjusted dollar volumes, one that is annualized to eliminate seasonal fluctuations and show trends more clearly, and the one we have reproduced here which has been annualized and adjusted for inflation to more accurately portray physical volume.

The study released in January, 1983, indicates that air conditioning sales, which have been in a two-year decline, are past their low point and are expected to rebound slowly to reach the 1980 level by the second quarter of 1983.

TURN TO NEXT PAGE




**1980 TO 1984 FORECAST** prepared for NHAW has been deseasonalized and adjusted for inflation to reflect physical volume rather than dollars. The index of real growth is based on a sales level for the second quarter of 1980 equaling 100.

FROM PRECEDING PAGE

The general outlook is for modest improvement, with a progressively sharper upturn as 1984 draws near.

The study also indicates that:

**Air conditioning** was improving in the fourth quarter of 1982 and by the end of this year, air conditioning sales are expected to be about 115% of what they were in 1980 when deseasonalized and adjusted for inflation.

**Refrigeration** sales are expected to remain relatively stable this year, at about the same level as in 1980. In real terms, refrigeration sales showed about a 10% improvement in late 1981 but, by mid-1982, had returned to the base 1980 level.

**Controls** showed some improvement in the third quarter of 1982. Volume this year, at about 5% above the 1980 base, could move upward by another 5% in the fourth quarter.

**Sheet metal** sales should continue at 1982's pace through the first quarter of this year, at about 10% above the 1980 pace, but through the rest of the year should increase steadily to 125% of the 1980 level before levelling off in the first quarter of 1984.

**Plumbing** sales, which had dropped by about 10% in 1982, had started an upward climb by year's end that, by the end of this year, should reach about 125% of the 1980 level.

NHAW members reported an average dollar sales decrease of 4.94% in 1982 when compared to the previous year's figure. The median decline was 3.6%. Canadian members reported an average decline of 9.22% when compared to 1981 experience, and a median decline of 10.9%.

With 131 firms reporting, NHAW provides data for 12 regions. It does not estimate total dollar volume for all members.

The only regions to report dollar sales growth in 1982 were Region 9 (Montana, Wyoming, Colorado, New Mexico, and Utah) with an average of 4.26%; Region 2 (New York, New Jersey, and Pennsylvania) with an average of 3.63%; and Region 1 (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island) with an increase of 2.07%.

The largest decrease, at 18.85%, was recorded by Region 10 (California, Nevada, Arizona, and Hawaii). The median decline in these states was 16.35%.

## Selected median* figures from all reports

Percentages shown in this table are expressed as a percentage of total sales.

| | 1981 | 1980 | 1979 | 1978 | 1977 |
|---|---|---|---|---|---|
| Total sales | $7,398,719 | $5,159,099 | $5,731,934 | $4,965,939 | $3,630,039 |
| Sales change from last year | 8.45 | 10.09 | 13.89 | 14.31 | 10.26 |
| Return on investment | 19.21 | 20.39 | 13.38 | 15.77 | 14.19 |
| Average collection days | 36.41 | 38.43 | 40.93 | 41.88 | 40.30 |
| Merchandise turnover times | 3.80 | 3.73 | 3.72 | 3.82 | 3.77 |
| Inventory change from last year | 8.15 | 2.87 | 11.10 | 12.85 | 11.60 |
| Sales per employee | $160,623 | $144,670 | $140,619 | $128,700 | $117,824 |
| Cost of goods sold | 73.66 | 74.18 | 74.41 | 74.30 | 73.22 |
| Gross profit | 26.34 | 25.87 | 25.44 | 25.90 | 26.15 |
| Total selling expense | 6.31 | 7.40 | 7.78 | 7.33 | 6.81 |
| Total delivery expense | 1.08 | 1.17 | 1.16 | 1.08 | 1.40 |
| Total occupancy expense | 2.18 | 2.12 | 2.26 | 2.60 | 2.66 |
| Total general & admin. expense | 9.58 | 9.32 | 9.53 | 8.54 | 8.74 |
| Total operating expense | 20.99 | 22.63 | 22.16 | 21.00 | 21.58 |
| Net profit before taxes | 3.97 | 4.07 | 4.20 | 5.00 | 3.98 |

**WHOLESALER OPERATING SURVEY** provides selected data from ARW's wholesaler operating survey. Conducted in 1982, the survey reveals the financial performance of members during 1981. *Median, as distinct from "mean" or "average," is the number in the middle when numbers are arranged in numerical order from high to low.

# The replacement market

It was another year when, because of high unemployment and high interest rates, both new residential construction and replacement sales were at a low ebb. But there were some bright spots and, with interest rates falling, the prospects for this year are considerably better.

Although replacement markets held relatively strong through most of 1981, the economy and high interest rates finally took their toll last year on both residential air conditioning replacements, which dropped 28%, and gas furnace replacements, which decreased by 23.7%.

In terms of percentage of total shipments, air conditioning replacements dropped from a 37% share in 1981 to 33.5% last year. Similarly, gas furnace replacements dropped from a 56.5% share of the gas furnace market in 1981 to 52.3% last year.

The only replacement category to increase last year was oil furnaces, which increased from 66,200 units in 1981 to 89,500 units last year, or 35.2%. They accounted for 86.5% of the oil furnace market in 1982.

Residential boiler replacements, which accounted for 93% of that market in 1981, slipped to an 86.4% share last year. The decline in replacement units was from 209,500 in 1981 to 190,200 last year, or 9.2%.

### Air conditioning

In the case of unitary air conditioning, the replacement market must be separated into three parts — home comfort cooling, heat pumps, and commercial.

If we subtract 504,786 heat pumps from the 2,367,483 unitary air conditioners shipped in 1981, we get 1,862,697 comfort cooling units — of which 1,434,300 (77%) were residential and 428,400 (23%) were commercial. This is based on an Air-Conditioning and Refrigeration Institute (ARI) breakdown not available for last year's Statistical Panorama.

It might be noted, too, that an unpublished Bureau of the Census survey (see "Comfort in construction") has cast new light on the multifamily heat pump market which, in addition to clarifying heat pump use in multifamily units, has also helped lend more accuracy to the comfort cooling market breakdown.

Of the 1,434,300 residential cooling units shipped in 1981, we estimate that 28.8%, or 414,000 units (274,400 single-family, 140,000 multifamily) went into new construction, 530,700 (37%) were replacement units, 418,000 (29%) were add-ons, 43,000 (3%) went into new mobile homes, and 28,000 (2%) were mobile home replacements.

From the 1982 total unitary shipments of 1,861,243 units, we must subtract 383,515 heat pumps. This brings the total comfort cooling units shipped to 1,477,728 — of which 1,137,850 (77%) were residential and 339,900 were commercial.

Of the estimated 339,900 commercial cooling units shipped in 1982, we figure that about 80%, or 271,900 units, went into new construction last year and 68,000 units, or 20%, were replacements.

Of the 1,137,850 residential cooling units shipped in 1982, we estimate that 418,400 units, or 36.7%, (265,000 single-family, 153,400 multifamily) went into new construction, 381,200 units (33.5%) were replacements, 273,200 units (24%) were add-ons, 40,000 went into new mobile homes, and 25,000 were mobile home replacements.

Despite the drop in the total number of replacement air conditioners last year, we feel the proportion of replacements will continue to increase steadily. That the percentage dropped last year in addition to the total numbers was more a reflection of the economy and of conservative attitudes on the part of homeowners than it was a reversal of that trend.

Contractors reported that, particularly in late summer, many homeowners elected not to repair or

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FROM PAGE 119

replace failed units because of a lack of confidence about the security of their jobs. That attitude, we feel, should gradually subside in 1983 and 1984.

The surge in replacements, which some industry sources feel will reach 60% of the total market by 1987, is coming from three directions. The main thrust comes from the fact that, for more than a decade, the industry has been adding central residential air conditioning units, both new and replacements, at an annual rate of 1.2 million units.

Some owners of older and less efficient equipment are deciding on their own to replace their unit in order to reduce operating costs. Many of these older units have SEER's (seasonal energy efficiency ratios) in the range of five or six while today's units have SEER's of up to 10 or more, a major consideration for those who face many operating hours.

A significant factor, too, has been the ever-widening utility rebate programs designed to help electric utilities postpone the addition of new generating facilities. These programs offer the homeowner a rebate of as much as $60/ton for units with an SEER of at least 8.5 and $120/ton for units with an SEER of at least 10.

Looking ahead to 1983, we think residential replacement shipments, 487,700 units, will represent a 28% increase from the 381,200 replacements we estimate were shipped last year. The proportion of total shipments, at about 33%, will stay the same.

The reason, we feel, is that the surge of equipment for new construction will tend to distort the share. Too, the economy generally is not likely to recover nearly so fast as housing starts and homeowners in 1983 probably will retain much of their conservative attitude of last summer.

For the record, we forecast there will be 1,780,000 unitary air conditioners shipped in 1983 (2,260,000 total units less 480,000 heat pumps) and that 338,200 (19%) will be commercial units, of which 253,600 (75%) will go into new construction and 84,600 (25%) will be commercial replacements.

Of the 1,441,800 residential units, 586,300 units (372,800 single-family, 213,500 multifamily) will go into new construction, or 40.6% of the total; 487,700 (33.8%) will be replacements; 302,800 (21%) will be add-on units; 44,000 (2.8%) will go into new mobile homes; and 25,000 (1.7%) will be mobile home replacements.

### Add-ons

The add-on market, which once led replacements by a wide margin, was estimated at about 29% of central residential comfort cooling shipments in 1981. We estimate the proportion slipped to 24% last year and that it will decrease further to 21% in 1983.

In prior years, the number of add-on units tended to increase in years with few housing starts as people opted to fix up their present homes rather than buy new ones. However, the high interest rates of the past few years have affected the add-on market as much as they have affected new construction.

Even replacement sales last year were affected by both high interest rates and a lack of consumer confidence. Usually they escape these influences because they are prompted by either necessity (a failed unit) or by the desire to lower operating costs.

We suspect, however, that add-on air conditioning sales will get a small but significant boost from the fact that more and more homeowners are replacing inefficient furnaces. Some of these people will elect to add comfort cooling at the time they replace their furnace, a reversal of the phenomenon of the past when add-on air conditioners helped increase furnace sales.

### Heat pumps

The picture for heat pumps is somewhat cloudier. Of the 504,786 heat pumps shipped in 1981, we estimate that 89.2%, or 450,300 units, were for residential applications and 10.8%, or 55,000 units, were for commercial applications. About 49,500 units, or 90%, of commercial units went into new construction and only about 5,500 units, or 10%, were replacements.

Of the residential heat pumps shipped in 1981, some 275,000 (170,000 single-family, 105,000 multifamily) went into new construction, 102,600 (22.8%) were replacement units, 68,000 (15.1%) were add-ons, and 4,000 units (0.9%) went into mobile homes as both new and replacement units.

It is in 1982 that our analysis would appear to have gone sour. Of the 383,515 heat pumps shipped last year, we are reasonably confident that 321,500 units (83.8%) were residential and 62,000 units (16.2%) were commercial units. We estimate that 55,800 commercial units (90%) went into new construction and that 6,200 (10%) were replacements.

We are also reasonably confident that, of the 321,500 residential units shipped last year, 295,700 of them went into new construction (175,800 single-family, 119,900 multifamily). But that leaves only 25,800 units to take care of replacements, adds-ons, and mobile homes. Inventory shifts could account for some of the discrepancy. Perhaps when we have access to more figures later in the year we'll be able to explain this obvious aberration.

The same problem holds true for 1983. In order to be on the safe side, we're forecasting that heat pump shipments in 1983 will total 480,000 units, of which 415,000 units (86.5%) will be for residential markets and 65,000 units (13.5%) will be commercial. Of the commercial units, 58,500 (90%) will go into new construction and 6,500 units (10%) will be replacements.

Of the 415,000 residential units we expect to be shipped this year, we estimate that 390,300 units (223,500 single-family, 166,800 multifamily) will go into new construction. The remaining 24,700 units, then, would be split between replacements, add-ons, and mobile homes.

### Boilers

Of the 220,222 residential boilers shipped in 1982, only 26,500 went into new single-family homes and, when multifamily units are taken into account, that number probably approaches 30,000 units. The rest were replacements.

It might be noted that the gas conversion phenomenon, which caused large increases in gas-fired residential boiler shipments for two years, now is mostly over.

We feel that residential boiler replacements will hold even in 1983. Most of the estimated 8% increase in boiler shipments will be absorbed by the new construction market.

### Furnaces

Of the 81,200 oil furnaces shipped

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# Our unofficial estimates of unitary market shares

When it comes to figuring the shares of the unitary air conditioning market held by individual manufacturers, we must rely on "feel" rather than reliable numbers. There are no reliable numbers.

Each year, too, the percentages shift a bit as companies enter or leave the market, one company is acquired by another, or distribution-product-promotion improvements are reflected in the marketplace.

And like all national figures, they don't give a clear picture of market shares in any specific city or area of the country. In fact, some of the essentially regional manufacturers, with a small national share of the market, often are among the leaders in those areas where their distribution is concentrated.

Another distortion comes from the interest of the reader. Whether a particular manufacturer is strong in the new-home or the add-on market makes little difference to many. But to a contractor who specializes, the list of competitive brands can expand or contract according to his interests — and change when his emphasis changes.

Because of these and other situations within their own cities, contractors often get a distorted view of national market shares. For them, and for researchers and others not deeply involved in the air conditioning industry, The News offers these educated guesses of unitary equipment market shares in units:

Carrier (including Bryant, Day & Night, Payne) — 22%.

Lennox — 13%.

Rheem-Ruud — 13%.

Trane — 13%.

Whirlpool, Heil-Quaker — 8%.

York (including Borg-Warner Central Environmental Systems) — 6%.

Fedders (including Airtemp, Mueller Climatrol), Magic Chef (Johnson, Air-Ease, Williams, Armstrong, Gaffers & Sattler), and Heat Controller — 2% each.

The list adds up to more than 80% of the unitary market. The real difficulty comes in attempting to rank those manufacturers with a 1%, 2%, or 3% market share. It must be remembered, too, that 2% of a 2.5 million market means annual shipments in the order of 50,000 units.

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FROM PAGE 121

in 1981, a total of 15,000 went into new single- and multifamily homes. The remaining 66,200 units were replacements, or 81.5% of the market.

Similarly, a total of 14,000 of the 103,500 oil furnaces shipped last year went into new single- and multifamily homes. The remaining 89,500 units, or 86.5%, were replacements. This represents an increase of 23,300 units, or 35%, in oil furnace replacement sales.

A slowing rate of conversions from oil to gas, due to natural gas price increases while oil prices were declining, and fears of additional gas price increases following decontrol, were the principal reasons for the increase.

Fuel Oil/Oil Heat and Solar Systems magazine estimated that close to 80% of the 545,000 replacement oil burners shipped last year were retention head or other high-efficiency types.

Of the 1,146,700 residential gas furnaces shipped in 1981, a total of 413,000 went into new single- and multifamily homes, 200,000 were conversions from other fuels, and 800,000 were replacements.

Similarly, the 1,165,200 gas furnaces shipped last year included 379,700 for new single- and multifamily homes, 175,000 for conversions from other fuels, and 610,500 were replacements, a 23.7% drop from the previous year's experience.

New high efficiency and ultra high efficiency gas furnaces coming into the market are expected to swell replacement figures over the next few years. Within a year, virtually all manufacturers will be able to offer seasonal efficiencies in the 80% to 85% range and most will be able to offer efficiencies in the 90% to 95% range.

Despite the 16% drop in overall gas furnace shipments last year, manufacturers of ultra high efficiency furnaces reported they were selling as many as they could make. Most of these were replacements. In fact, one manufacturer reported three of four were replacing older equipment in good working order so that homeowners could improve on efficiency.

On the other side of the ledger, however, conversions to gas from other fuels are expected to decline over the next year to somewhere between 125,000 and 150,000 units. Conversions from other fuels to oil have held even for the last two years at 11,000 units.

## Age of residential heating equipment

| | 4 years or less | 4 - 10 years | 11 - 20 years | 20 - 40 years | 41 years or more | Don't know | No response |
|---|---|---|---|---|---|---|---|
| U.S. total 34,600,000 homes | 17.0% | 29.7% | 28.9% | 14.1% | 1.1% | 5.6% | 4.7% |
| New England 2,060,000 homes | 11.6 | 24.7 | 32.5 | 20.2 | 3.0 | 5.3 | 2.7 |
| Mid Atlantic 5,581,000 homes | 10.8 | 24.2 | 32.4 | 20.3 | 1.7 | 5.8 | 4.8 |
| East North Central 7,497,000 | 15.5 | 30.0 | 31.7 | 13.3 | 1.0 | 5.8 | 2.7 |
| West North Central 2,926,000 homes | 17.0 | 27.7 | 30.1 | 17.1 | 1.6 | 3.9 | 2.6 |
| South Atlantic 4,988,000 homes | 21.0 | 36.6 | 23.9 | 8.5 | 1.0 | 4.5 | 4.5 |
| East South Central 1,925,000 | 21.0 | 33.9 | 24.4 | 7.0 | * | 5.7 | 8.0 |
| West South Central 3,091,000 homes | 24.8 | 35.1 | 25.9 | 5.9 | * | 6.2 | 2.1 |
| Mountain 1,714,000 homes | 21.5 | 34.5 | 27.4 | 10.1 | 1.5 | 4.7 | 0.3 |
| Pacific 4,897,000 homes | 16.7 | 25.5 | 28.0 | 18.9 | 1.3 | 7.2 | 2.4 |

* less than 1%

Source: Bureau of the Census, 1977 Housing Survey

# Fuels and energy

United States energy consumption in 1982 was 70.923 quadrillion Btu (quads), about 4.3% less than the year-previous total of 74.123 quads and 10.1% below the 1979 total of 78.9 quads, according to the U.S. Department of Energy (DOE).

The total energy consumed in the U.S. last year was almost 5% below the consumption level of 1973, the year of the Arab oil embargo.

In the residential and commercial sector, the 26.278 quads consumed last year was 2.4% more than the revised 1981 figure of 25.659 quads. The 1982 figure represents an 8.6% increase over the 24.197 quads used by the residential-commercial sector in 1973. In 1982, this sector represented a 37.05% share of total energy consumption, up from 35.5% in 1981.

Industrial sector consumption amounted to 25.927 quads last year, down 11.2% from the 29.192 quads consumed by this sector in 1981. The industrial total last year also was 18.7% less than the 31.886 quads consumed in 1973. It represented 36.56% of the total energy consumed by the nation last year, down from 39.3% in 1981.

Consumption in the transportation sector in 1982 totaled 18.642 quads, down 3.2% from the 19.259 quads consumed by this sector in 1981. The transportation total last year was 0.66% more than the 18.52 quads consumed in 1973. It represented a 26.28% share of total consumption last year, up from a 25% share in 1981.

Electric utilities consumed an estimated 24.403 quads of energy in 1982, down 1% from the revised total of 24.663 quads consumed in 1981. The total last year was 22% more than the 20 quads consumed by electric utilities in 1973.

Of utility energy consumed in 1982, coal accounted for 52%, natural gas 13.7%, petroleum 7.4%, hydroelectric 14%, nuclear 12.3%, and 0.45% was from other sources. Both natural gas and petroleum use were down slightly from 1981 while the coal and nuclear shares increased slightly. Petroleum had an 18.3% share in 1973 and coal accounted for 43.3% in that year.

Of the 26.278 quads used last year in the residential and commercial sector, 0.77% was coal, 28.45% was natural gas, 11.29% was petroleum, 17.36% was electricity sales, and 42% was represented as electrical generation and transmission losses.

Similarly, the 25.927 quads used by the industrial sector last year breaks down this way: 10.35% coal, 26.56% natural gas, 29.4% petroleum, 0.13% hydroelectric, 9.8% electricity sales, and 23.84% represented as electrical generation and transmission losses.

In order to get a gross measure of conservation, DOE records show that it took 59,500 Btu to generate each constant dollar of gross national product (GNP) in 1973. In 1982, it took only 48,100 Btu to generate a constant dollar of GNP, or 19.16% less than in 1973.

In simple terms, this means the U.S. economy last year produced $1.476 trillion in total goods and services with 19.16% greater energy efficiency than in 1973. Had it not been for this improvement in efficiency over the past decade, total U.S. energy consumption last year would have been 87.82 quads.

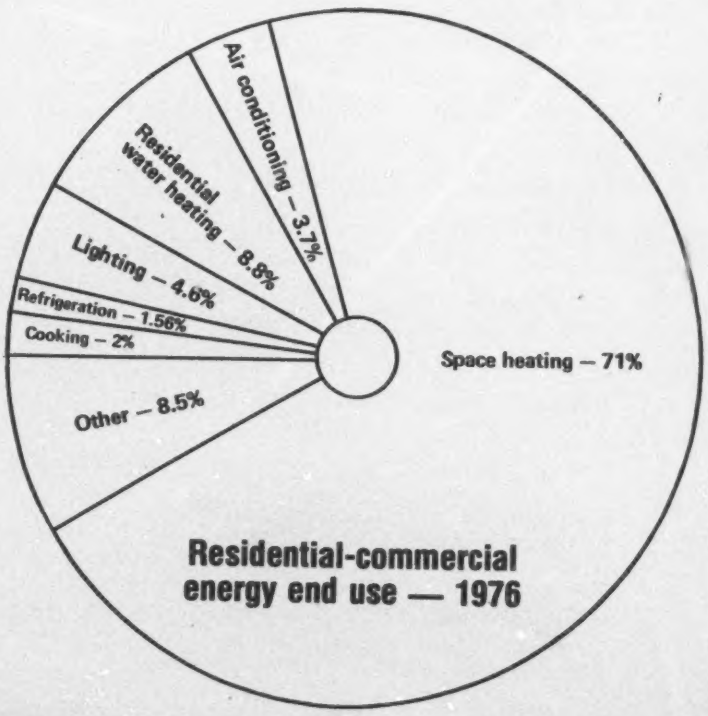
### Fuel costs

A two-year tally of fuel prices compiled by the Department of Labor as part of the cost-of-living index shows that, from December, 1981, to December, 1982, fuel oil prices dropped 1.5% from $1.247/gal to $1.229/gal. Since that time, oil prices have declined to about $1.14/gal, or an 8% drop.

During the same period, natural gas prices increased by 27.5% from $46.369 per 100 therms to $59.156 ($72.951 in the Northeast, $48.55 in the West), and 500 kWh of electricity increased by 6% from $34.96 to $37.074 ($45.667 in the Northeast, $32.321 in the West).

### Electricity

A decrease of 1.3% of electricity output in the United States last year was reported by the Edison Electric Institute (EEI). Total net electricity



for distribution in 1982 was 2,263.5 trillion kWh. It compares to 2,295 trillion kWh in the previous year.

This is only the second time in modern history that electricity generation has declined. The first time was the 0.3% decrease recorded in 1974, the year following the Arab oil embargo.

Peak power demand in the U.S., including Alaska and Hawaii, was forecast at 416,305 MW for the winter of 1982-1983 by the Federal Power Commission. This compares to a winter peak of 402,370 MW for the winter of 1981-1982 and 430,497 MW for the winter of 1983-1984.

The forecast for the peak power demand in the summer of 1983 is for 468,061 MW. In 1982, however, peak power demand was 2.7% below the 1981 summer peak, the first time a summer peak declined from the previous year since 1945.

Total kWh sales in 1982 declined by 0.55% from 2,152,851 million kWh in 1981 to 2,141,118 million kWh last year. Commercial sales, at 554,236 million kWh, were up 3% from 537,655 million kWh in 1981; industrial sales, at 761,943 million kWh in 1982, were down 5.38% from the previous-year figure of 805,282 million kWh; and residential sales, at 748,112 million kWh last year, increased by 1.2% from 733,467 million kWh in 1981.

Installed capacity in all 50 states in 1982 was 642,037 thousand kW, a 2.2% increase over the installed capacity of 628,305 thousand kW in 1981. The average number of customers increased by 1.6% in the same period, from 93,348,000 in 1981 to 94,811,000 last year.

### Nuclear

During November, 1982, U.S. nuclear power plants generated a total of 23.2 billion net kWh of electricity, equivalent to a daily output of 774.5 thousand net kWh. This was 2% above the comparable output for November, 1981.

Nuclear power supplied 13.4% of the electricity generated by domestic utilities in November, 1982, the same percentage as in the previous month and the third highest proportion of electricity demand met by nuclear power to date. Top nuclear production was the 14.1% recorded in September, 1982.

There were, as of Nov. 30, 1982, a

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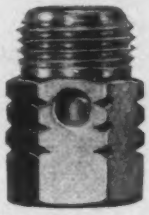

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FROM PAGE 125

total of 79 licensed U.S. nuclear power reactors with a combined capacity of 61,523 net MW of electricity. Of these 79 units, two were in start-up procedures, four were in power ascension, and 22 generated no electricity or were operating at substantially less than full capacity.

The number of nuclear power plants in all stages of planning, construction, or operation stood at 144 units, with an aggregate capacity of 135.2 million net kW.

Through the first 11 months of 1982, the 79 reactors licensed for commercial operation were generating between 20,188 million net kWh/month to 25,678 million net kWh/month. The capacity factor in 1982 averaged 55% compared to 54.8% in 1981.

### Natural gas

Gas utility thermal equivalent sales have been provided by the American Gas Association (AGA) with this caveat: 1981 sales are actual; 1982 figures are those that had been forecast for the year.

Given this distinction, AGA reported an overall decline of 7% in 1982 sales; actual 1981 sales totaled 15,379.9 trillion Btu, while forecast sales for 1982 totaled 14,094.5 trillion Btu.

Within that total, forecast residential sales for 1982 were 4,756.4 trillion Btu, up 3.4%; commercial sales were 2,408.1 trillion Btu, up 2%; and industrial sales were 6,930 trillion Btu, down 15.7%.

Although final average national gas utility prices are not yet available, data for the first three quarters of 1982 shows a strong inflationary pattern.

For the respective first three quarters, prices expressed in dollars per million Btu are: residential $4.54, $5.03, and $5.91; commercial $4.41, $4.71, and $4.94; and industrial $3.83, $3.95, and $4.09.

Energy Secretary Donald Hodel said he believes the price of natural gas would drop between 10 cents per thousand cubic feet and 30 cents per thousand cubic feet in the first year after enactment of legislation submitted to Congress Feb. 28 by President Ronald Reagan.

The legislation would deregulate the wellhead price of natural gas by 1986 through negotiation of new contracts or renegotiation of old ones. Consumer protection would include a moratorium on automatic pass-through costs greater than inflation. Prices that could be charged under old regulated contracts would be limited to the volume-weighted average price of new contracts or the old controlled price, whichever is less.

AGA reported that, in 1981, additions to natural gas reserves exceeded the amount of gas produced by 14%. This is the first time in 14 years, with the exception of the Prudhoe Bay discovery in 1970, that this has happened. According to AGA, it is part of a trend that started with passage of the Natural Gas Policy Act of 1978.

AGA's Gas Supply Committee reported that, by the year 2000, the gas industry will be able to supply between 22.7 trillion ft³ and 31 trillion ft³ per year from a combination of conventional and supplemental sources.

The association's studies project that increases of both wellhead and consumer prices will begin to stabilize and moderate during the period 1982 to 1992.

Over the next five years, the wellhead price of gas will increase at a declining rate — averaging 8%/year after inflation, in contrast to a 25%/year increase after inflation between 1972 and 1977 and a 16%/year increase after inflation between 1977 and 1982.

The retail price of gas to all consuming sectors, residential, commercial, and industrial, increased at rates after inflation of 14% between 1972 and 1977, and 7%/year after inflation between 1977 and 1982. It is expected to rise more gradually, increasing at 5%/year after inflation between 1982 and 1987, and 1%/year to 2%/year after inflation in the period 1987 to 1992.

### Coal

The U.S. coal industry, with its major markets depressed, sees only minimal growth in production in 1983.

The National Coal Association (NCA) forecasts production will rise 17 million tons, or 2.1%, to 837 million tons in 1983. However, despite this modest improvement, this year's

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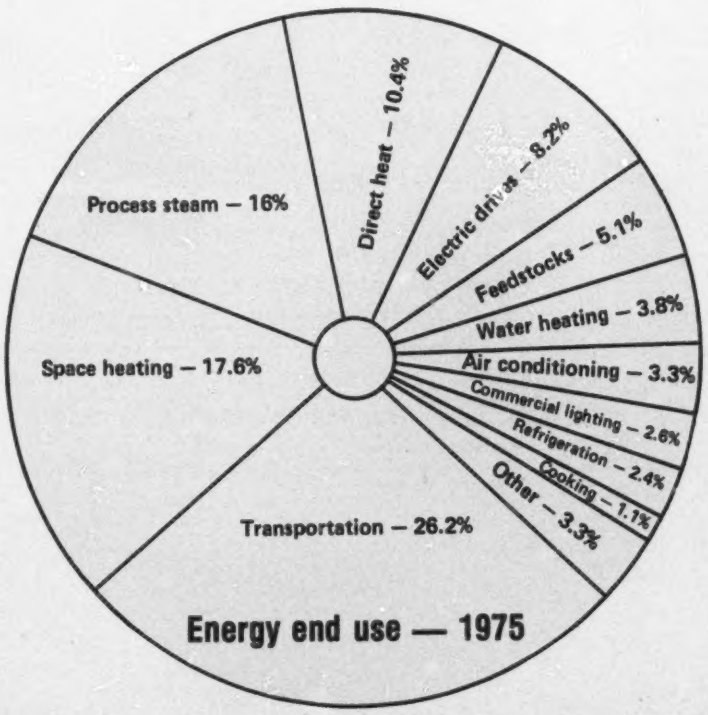

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FROM PRECEDING PAGE

production still will be only 1.6% higher than the record 824 million tons mined in 1980.

With the continuing recession in 1982, coal consumption lagged and stockpiles at mines and at utilities grew. As a result, production began to drop in the last half of 1982, and is expected to continue to be dampened this year as stockpiles are reduced.

"The coal industry was slow feeling the effects of the recession and it will be slow coming out of it," said NCA president Carl E. Bagge.

Looking at 1983, NCA's Economics Committee forecasts domestic coal consumption and exports will reach 837 million tons, 3.5% higher than 1982's level of 809 million tons. This projected growth is based on an expected gradual but sustained overall economic recovery beginning in the second quarter of 1983 as a result of declining interest rates.

Metallurgical coal use by the industrial sector dropped drastically last year from 61 million tons in 1981 to an estimated 41 million tons in 1982. The steel industry, which operated as low as 31% of capacity and averaged only 48% last year, produced less than 75 million tons of raw steel last year. Capacity utilization in 1983 should climb to 58% and coal use should recover to 50 million tons.

Electric utilities, by far the largest consumers of coal, are expected to increase coal use by 4.2% in 1983, based on a projected 3% gain in electricity sales. Despite a near 2% drop in electricity generation last year, brought on by the recession and mild weather, coal use by utilities dropped only slightly from 596 million tons in 1981 to 590 million tons last year.

General industry and retail consumers are expected to increase their use of coal by 4.2% from 72 million tons in 1982 to 75 million tons this year.

Exports of coal, which remained strong until the end of 1982, totaled 106 million tons in 1982, just short of the 110 million tons shipped in 1981. Large stockpiles, stable oil prices, increased competition, and sluggish world economies are expected to hold 1983 exports to 97

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*Commentary*

# World oil surplus will help stabilize domestic energy prices

Although the decline in posted world oil prices will mean more in terms of stability for domestic oil and natural gas prices than it will in additional price reductions, it is probably fair to say that the days of oil as a political weapon have all but disappeared.

The primary reason is the fundamental change that has occurred in the world oil market since 1978, when imports from Arab members of the Organization of Petroleum Exporting Countries (OPEC) supplied 37% of all U.S. oil imports and 11% of total domestic consumption.

For comparison, the Arabs supplied 15% of all imports and 3.9% of domestic consumption in 1973, when their embargo brought on by U.S. support for Israel triggered long lines at gasoline pumps and fundamental changes in our attitude toward energy.

In the third quarter of 1982, imports into the U.S. from Arab OPEC countries, at 797,000 barrels/day, amounted to only 11.3% of all petroleum imports and 4% of domestic consumption. Significantly, at no time during the crisis in Lebanon last summer was there any mention of an oil embargo, or even a supply reduction by the Arab suppliers.

That 4% dependency on Arabian oil, about the same as in 1973, does not loom so large when it is considered that, a year ago, Mexico replaced Saudi Arabia as this country's largest single source of imported oil. The U.S. was importing about 700,000 barrels/day from Mexico and about 500,000 barrels/day from the Saudis.

Further, two other major U.S. suppliers, Canada and the United Kingdom, are not members of OPEC. Any action by OPEC against the U.S. short of an all-out price war likely would cause more worry than harm because, in all probability, any shortfall in U.S. needs could be made up by non-OPEC suppliers.

The danger of a price war also is remote because the Arab economies depend upon continued high oil revenues to finance their ambitious development plans. Early indications are that, because of the 15% reduction in the posted price of crude and the self-imposed limits on production, the Arab nations are willing to accept deficits rather than interfere with their peoples' expectations for a steadily improved standard of living.

This decision has serious implications for the industries served by this newspaper for two reasons. Exports of refrigeration and air conditioning equipment and supplies to the Middle East in recent years have accounted for a quarter of the more than $2 billion in total exports of these products. In short, the Arabs are our best foreign customers.

It should be noted, too, that trade relations between the U.S. and the Arab oil producers also have shifted dramatically in the past year. For the first six months of 1982, the U.S. registered a $1.2 billion trade surplus with the Arab countries, a sharp reversal from last year's $7.4 billion trade deficit for the same period.

For the present, then, oil would appear no longer to be useful as a political weapon. In the words of former Saudi oil minister Abdullah Tariki, "It's gone." At the time of the upheaval in Iran in 1979, almost 45% of the free world's oil supply passed through the Straits of Hormuz. Today that proportion is 27%.

But what about the future? There are some who would argue, with some justification, that when the economies of the industrialized nations emerge from the current recession, the world oil supply will tighten. And when those economies expand, the world could face another shortage by the early 1990's.

There are two principal factors that are likely to postpone the prospect of future world oil shortages, if not obliterate them altogether.

The first is energy conservation, not only in the U.S. but in all industrialized western nations. Data located elsewhere in this section indicates that the U.S., for example, requires 19% less energy today to produce a constant dollar of gross national product (GNP) than it did in 1973.

Continued dedication to conservation by the U.S. and other major petroleum consumers, plus the economic reality that price eventually induces consumers to get by with less, holds the promise that increases in oil consumption will be held to a minimum. Added insurance is the fact that energy costs are a significant factor in a competitive international economy.

It is that same emphasis on price that should also continue to encourage petroleum companies in non-OPEC nations to expand their exploration efforts, to find new oil fields and to go deeper into existing fields. The result should be an expanded world oil reserve account.

It would be unwise to look for much more in the way of world oil price reductions. For example, world oil prices of less than $25/barrel would

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# An industry's efficiency record

## All unitary air conditioners of 65,000 Btu/h and under

| EER and SEER | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|
| 7.5 and over | 23.4% | 30% | 36% | 43.9% | 49% | 58% | 79% |
| 8.5 and over | 5.2% | 5.7% | 10.2% | 13.2% | 15.6% | 23.9% | 45.7% |
| 9.5 and over | 0.03% | 0.35% | 2.02% | 1.5% | 2.7% | 4% | 4.6% |

## Unitary heat pumps of 65,000 Btu/h and under

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7.5 and over | 10.6% | 14.8% | 35% | 39.6% | 54.5% | 72% | 75.1% |
| 8.5 and over | 4.5% | 0.4% | 0.4% | 0.6% | 2.3% | 2.8% | 2.9% |

## Split-system air conditioners of 65,000 Btu/h and under

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7.5 and over | 28.2% | 31.7% | 41.2% | 43.6% | 45.9% | 55% | 78.2% |
| 8.5 and over | 6.3% | 6.9% | 12.2% | 12.2% | 15.8% | 21.4% | 45.7% |
| 9.5 and over | 0.02% | 0.4% | 2.5% | 1.8% | 3% | 4.7% | 5.4% |

## All DOE-covered unitary air conditioners

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7.5 and over | 23% | 30% | 36% | 44% | 49% | 58% | 79% |
| 8.0 and over | — | — | — | — | — | 45% | 70% |
| 8.5 and over | 5% | 6% | 10% | 13% | 16% | 23% | 46% |

## DOE-covered unitary heat pumps

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7.5 and over | 11% | 15% | 35% | 40% | 55% | 72% | 75% |
| 8.0 and over | — | — | — | — | — | 35% | 41% |
| 8.5 and over | 5% | — | — | 1% | 2% | 3% | 3% |

**NOTE:** Statistics for the years 1976 through 1980 are based on EER's (energy efficiency ratios) and those for 1981 and 1982 are based on SEER's (seasonal energy efficiency ratios). Percentages for 1982 are based on shipments for the first nine months; other years reflect all 12 months.

FROM PAGE 128

million tons.

Coal production is expected to rise only modestly in both the eastern and western halves of the nation. Production east of the Mississippi will grow from 550 million tons to 557 million tons while production in the west is expected to grow from 270 million tons to 280 million tons.

### Imports

Net energy imports into the United States declined by 24.2% last year from 9.583 quads in 1981 to 7.264 quads last year. The 1981 figure represented a 22% decline from the previous year.

Net imports declined for all types of energy except natural gas, which increased by 8.6%, and electricity, which held even with the experience of 1981. The largest changes were in refined petroleum products, which declined by 20% to 2.057 quads in 1982, and in U.S. coal and coke exports, which increased by 35.3% last

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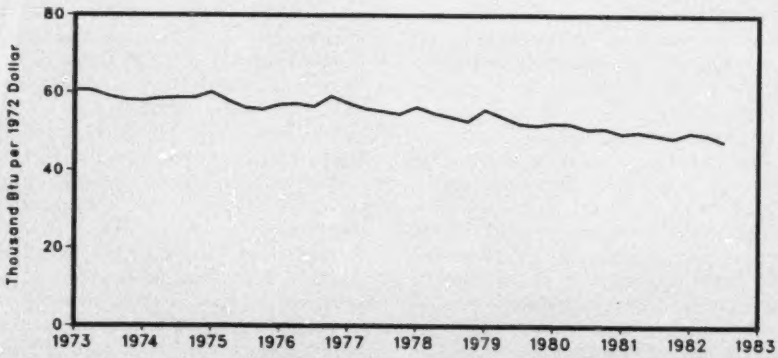


**U.S. ENERGY CONSUMPTION** per constant dollar of gross national product (GNP).

FROM PAGE 129

put the whole North Sea oil fields, where drilling and exploration expenses are high, in jeopardy. Too, U.S. domestic oil prices have been steadily approaching the world price.

And speaking of the domestic market, it must be remembered that most of the $5/barrel reduction in the OPEC price has been a fact of life for nearly a year. It was reflected in the discounts offered by some OPEC members, notably Nigeria, in the prices being charged by non-OPEC nations, and in prices being charged on the Rotterdam spot market.

Price reductions for petroleum-based fuels in the U.S. likely will be marginal. Much of the drop in the pretax price of gasoline will be taken up by the 5 cents/gal additional tax which goes into effect this month. And increases in truck consumption, in pace with a quickening economy, will prevent more than a two- or three-cent drop in diesel oil prices.

Home heating oil prices, which dropped 8% last year, are likely to drop by only about 2% in 1983. Another 4% drop in residual oil prices can be expected — a fact that will also mean good news for users of natural gas.

The price of natural gas, which increased by 27% for residential customers last year and by 19.9% for industrial users, still is being driven by take-or-buy contracts marketers signed with exploration companies to encourage them to go after deeper gas and so assure a larger future supply.

That steep rise in prices should flatten dramatically over the next two years, however, because the reduction in the price of residual oil — the chief competitor of natural gas — has brought the two fuels in close competition in a growing number of markets. This factor alone should take most of the sting out of decontrol, whether it comes in 1985 under current legislation or in 1986 under proposed legislation.

Residual oil prices amounted to $4.30 per million Btu in 1982, very close to the price of natural gas to industrial users. Remember, too, that nearly half of the natural gas sold to industry last year was used to fire boilers, most of which are equipped to switch easily from natural gas to oil.

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| | 1982–1983 This year | 1981–1982 Last year | Normal | Percent Change: This year vs. Last year | Percent Change: This year vs. Normal |
|---|---|---|---|---|---|
| **U.S. Total** | | | | | |
| July 1 - June 30 | — | 4,967 | 4,695 | — | — |
| July 1 - March 13 | 3,216 | 3,796 | 3,631 | -15.3 | -11.4 |
| **Cities** | | | | | |
| Albuquerque | 3,753 | 3,387 | 3,636 | 11 | 3 |
| Amarillo | 3,684 | 3,446 | 3,501 | 7 | 5 |
| Asheville | 3,320 | 3,683 | 3,535 | -10 | -6 |
| Atlanta | 2,462 | 2,753 | 2,699 | -11 | -9 |
| Billings | 4,629 | 5,600 | 5,637 | -17 | -18 |
| Boise | 4,274 | 4,703 | 4,597 | -9 | -7 |
| Boston | 3,992 | 4,782 | 4,438 | -17 | -10 |
| Buffalo | 4,550 | 5,655 | 5,393 | -20 | -16 |
| Cheyenne | 5,220 | 5,153 | 5,456 | 1 | -4 |
| Chicago | 4,521 | 5,930 | 5,251 | -24 | -14 |
| Cincinnati | 3,573 | 4,745 | 4,207 | -25 | -15 |
| Cleveland | 3,917 | 5,287 | 4,899 | -26 | -20 |
| Columbia, SC | 2,342 | 2,486 | 2,327 | -6 | 1 |
| Denver | 4,684 | 4,151 | 4,682 | 13 | 0 |
| Des Moines | 4,597 | 5,730 | 5,525 | -20 | -17 |
| Detroit | 4,459 | 5,766 | 5,136 | -23 | -13 |
| Fargo | 6,660 | 7,953 | 7,490 | -16 | -11 |
| Hartford | 4,532 | 5,142 | 5,096 | -12 | -11 |
| Houston | 1,423 | 1,342 | 1,322 | 6 | 8 |
| Jacksonville | 1,271 | 1,112 | 1,222 | 14 | 4 |
| Kansas City | 4,109 | 4,883 | 4,486 | -16 | -8 |
| Las Vegas | 2,146 | 1,850 | 2,300 | 16 | -7 |
| Los Angeles | 857 | 848 | 1,287 | 1 | -33 |
| Memphis | 2,462 | 2,977 | 2,845 | -17 | -13 |
| Miami | 130 | 151 | 204 | -14 | 36 |
| Milwaukee | 4,864 | 6,424 | 5,839 | -24 | -17 |
| Minneapolis | 5,652 | 6,914 | 6,625 | -18 | -15 |
| Montgomery | 1,760 | 2,018 | 2,038 | -13 | -14 |
| New York | 3,585 | 4,222 | 3,966 | -15 | -10 |
| Oklahoma City | 2,920 | 3,333 | 3,206 | -12 | -9 |
| Omaha | 4,776 | 5,876 | 5,036 | -19 | -5 |
| Philadelphia | 3,638 | 4,372 | 4,000 | -17 | -9 |
| Phoenix | 918 | 768 | 1,402 | 20 | -35 |
| Pittsburgh | 4,108 | 5,256 | 4,821 | -22 | -15 |
| Portland, ME | 5,231 | 5,890 | 5,787 | -11 | -10 |
| Providence | 4,080 | 4,986 | 4,678 | -18 | -13 |
| Raleigh | 2,797 | 3,119 | 3,032 | -10 | -8 |
| Richmond | 2,936 | 3,503 | 3,358 | -16 | -13 |
| Salem, OR | 3,293 | 3,633 | 3,623 | -9 | -9 |
| Salt Lake City | 4,337 | 4,224 | 4,757 | 3 | -9 |
| San Francisco | 2,133 | 2,189 | 2,212 | -3 | -4 |
| Seattle | 3,346 | 3,600 | 3,850 | -7 | -13 |
| Shreveport | 2,082 | 2,199 | 1,954 | -5 | 7 |
| St. Louis | 3,575 | 4,521 | 4,013 | -21 | -11 |
| Washington, D.C. | 2,973 | 3,608 | 3,556 | -18 | -16 |

**THE NATION'S WEATHER** through March 13, 1983, expressed in population-weighted degree days is depicted in the above chart for many U.S. cities. For the nation as a whole, last winter was the fifth warmest since records were first kept in 1932. It was 11.4% warmer than normal and 15.3% warmer than the winter of 1981-82. Degree days are the number of degrees that the mean temperature (average daily maximum and minimum temperature) that day is below 65ºF. Source: National Oceanic and Atmospheric Administration, Department of Commerce, and the Census Bureau.

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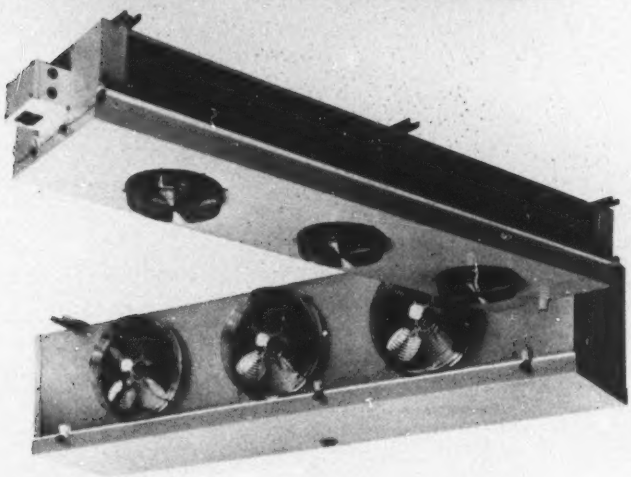

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**FROM PAGE 130**

year to 0.023 quads.

Crude oil imports, which include those for the strategic petroleum reserve, declined by 0.02% last year to 6.842 quads, almost the same amount as the 6.883 quads imported in 1973. Imported crude oil had soared to 13.921 quads in 1977.

World crude oil production, which had increased to 62,535,000 barrels/day in 1979, was down to 55,788,000 barrels/day in 1981, the last year for which complete figures are available. Through the first ten months of 1982, however, world production was in the order of 52 million barrels/day. Production in 1973 was 55,674,000 barrels/day, of which 30,989,000 barrels were produced by the Organization of Petroleum Exporting Countries (OPEC). The OPEC share in 1982 was 22,624,000 barrels/day.

### Exploration

Oil and gas wells drilled in 1982 reached an all-time high of 85,855, a 9.3% increase over the 78,538 wells drilled in 1981. DOE reports the 40% drop in the rotary rig count in December, 1982, reflects increased rotary rig productivity and delays in reporting.

Oil well completions during 1982 totaled 40,334, a 7.1% increase from the 37,671 wells completed in the previous year. There were 18,975 gas wells completed in 1982, a 6% increase from the 17,894 gas wells completed in 1981.

Footage drilled during 1982 totaled 396.4 million feet, up 9.7% over the 361.4 million feet drilled in the previous year.

### Solar

It seems that every year the Energy Information Administration (EIA) falls further behind in reporting solar collector shipments. Data for the first half of 1982 still were not available in March. The Solar Energy Industries Association (SEIA) currently is negotiating with DOE to obtain a contract to monitor and collect future solar collector shipment figures.

In the second half of 1981, only 9.2 million $ft^2$ of collectors were shipped by U.S. firms. This was the first time since records have been

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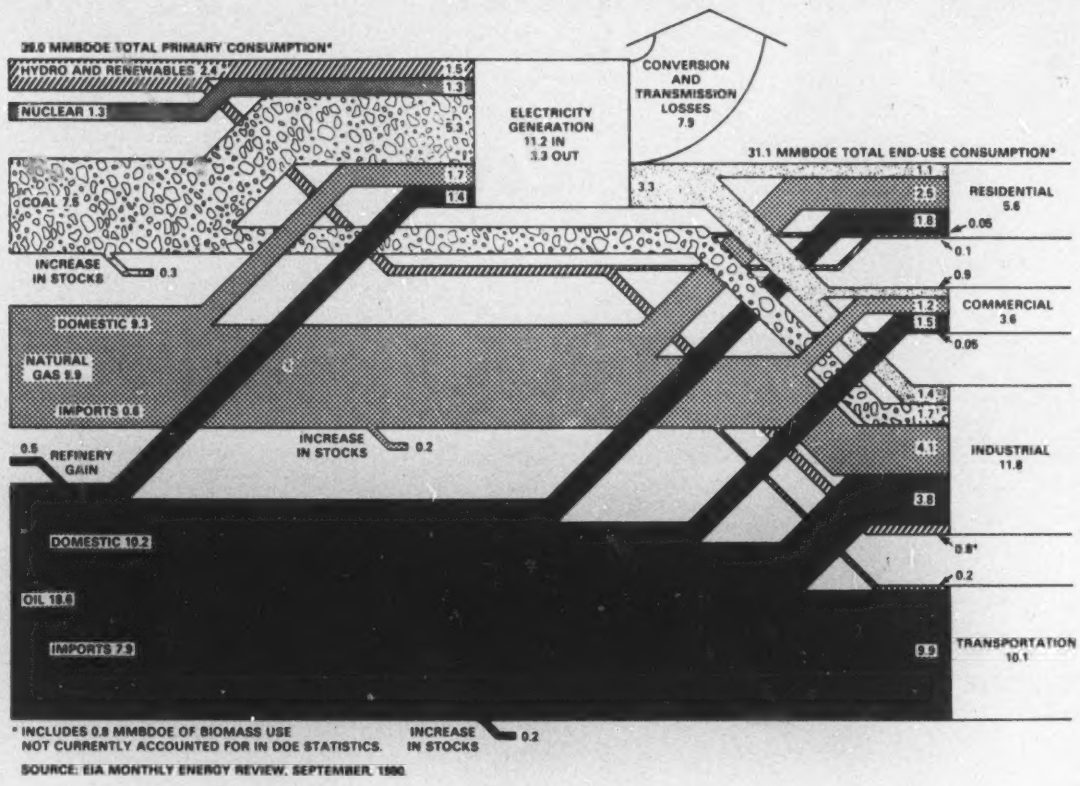


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FROM PAGE 134

kept (1974) that shipments have dropped from a prior half-year period.

Based on conversations with leading collector manufacturers, Solar Engineering and Contracting (SE&C) magazine believes that shipments for the first half of 1982 dropped again to a level near that of the first half of 1980, or 8.9 million ft².

Two factors should combine to show improvement in the second half of 1982, according to the magazine. Collector manufacturers typically ship more units during the second half of the year to match the solar selling season. Signs of an impending economic recovery may have sparked more shipments in the second half of the year, particularly in the fourth quarter. Total shipments in 1982, however, should be lower than for the previous year.

The solar industry believes it can arrest this slide in 1983 but few predict an enormous increase, according to SE&C. Shipments of 20 million ft² are possible this year — and from fewer manufacturers than in the previous three years. Predictions for 1984 and beyond will depend on whether solar tax credits are extended.

### Wood usage

According to a survey conducted for the U.S. Department of Energy by Response Analysis Corp., Princeton, N.J., more than 18 million homes used wood for at least part of their space-heating needs in 1980. Wood was the main heating fuel in 4.7 million homes, up 147% from 1978 experience.

The survey, which made projections based on 6,051 responses, indicated that 7.7 million homes were equipped with a wood stove or furnace. The installation rate was 1.8 million in 1979 and 2.3 million in 1980.

Hardwoods were the overwhelming choice of homeowners, who paid an average of $78/cord nationally in 1980. Usage amounted to four cords in the Northeast, 3.5 cords in the North Central states, 2.4 cords in the South, and 1.8 cords in the West. The survey also indicated that 300,000 homes use wood for cooking and 400,000 households use wood for domestic hot water heating.

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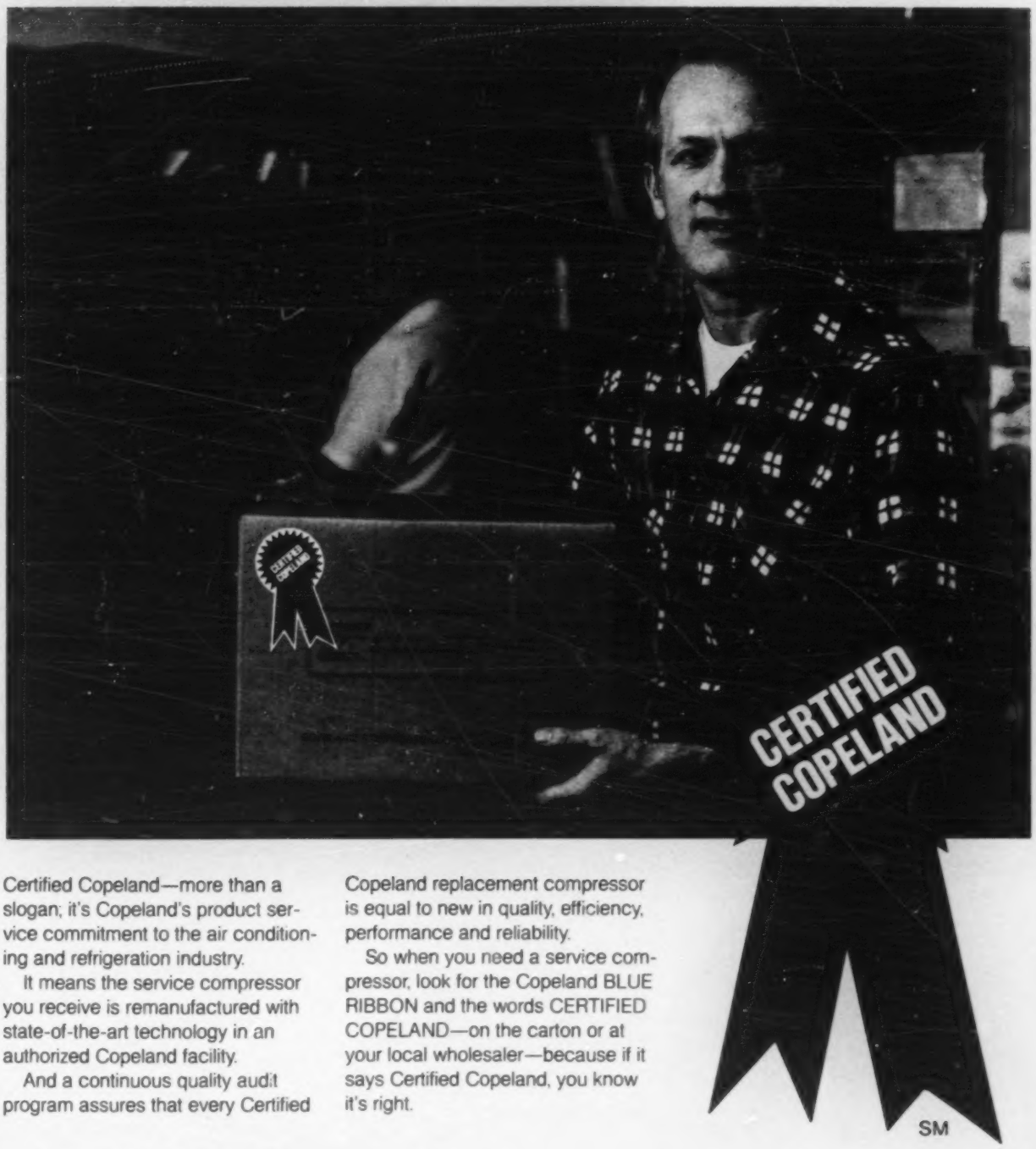


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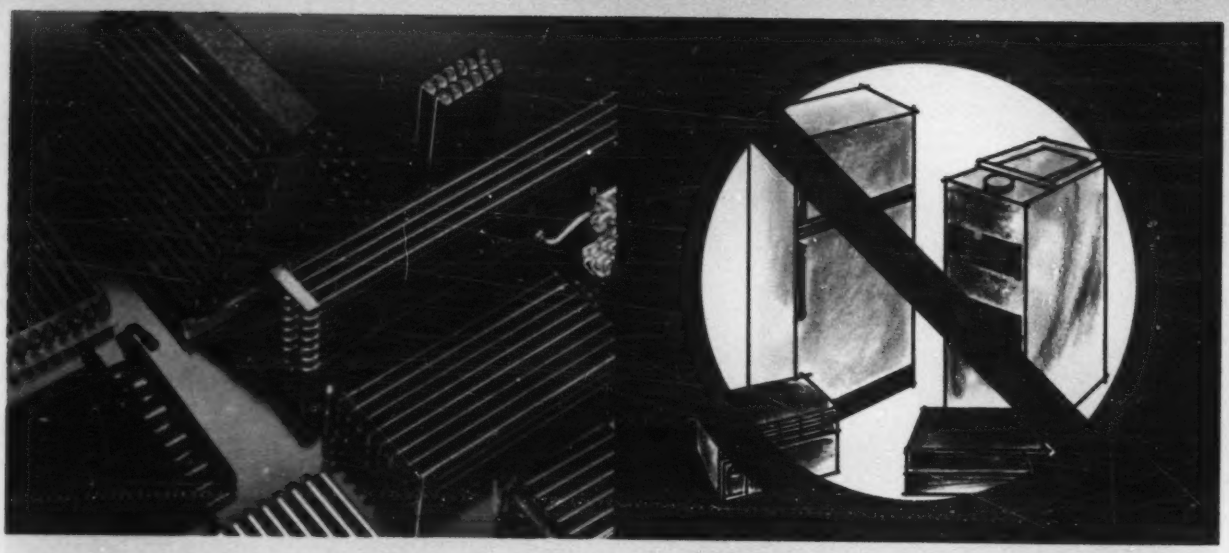

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